Biases in Creativity Assessment:

How the Social Setting Influences Observer's Perceptions of Team and Individual Creativity

by

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Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor of Philosophy
in Business Administration
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ABSTRACT

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Abstract

One important aspect of enhancing creativity in organizations is to measure and reward creativity. However, not every creative process can be immediately tied to and measured by numerical standards. In such cases, the manager's subjective impression of employee creativity may replace objective measures as the basis for decision-making. In an organizational context, the social context in which the work occurs must be thoroughly considered as employees often work in groups on major products. As such, this paper examines two questions on how the social setting affects the observer's perception of creativity assessment. First, I demonstrate that observers use surface features of groups to infer the creativity of group output: They expect demographically diverse groups to be more creative than homogeneous groups and this difference in expectation biases the evaluation. Second, when observers form impressions of individual creativity based on group output, I demonstrate that they commit the fundamental attribution error in partitioning credit between others in the group and the target individual. In turn this either benefits or costs the perceived creativity of the target, depending on the objective quality of group output. Taken together, the two questions addressed in this paper emphasize the need for further research on factors that influence the observer's perception of creativity in an organizational context.

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Acknowledgements

I would like to thank my mom, Jung Hee Kim, and dad, Won Am Kay, for their love and support during my Ph.D. I would also like to thank my grandfather and grandmother for their loving smiles and words of encouragement. I also thank my close friends who were always there for me. Lastly, I thank my advisors, Rick and Jack, for providing guidance and being so understanding. Thank you all.

Chapter 1. Introduction and Literature Review

Introduction

Businesses care about creativity because it is a source of innovation and performance. In a study by IBM, 1,500 Chief Executive Officers from 60 countries and 33 industries were interviewed, and it was found that CEOs believed that creativity is the most crucial factor for future success (IBM, 2010). In line with these beliefs, companies often instill various programs designed to promote the creativity of their employees. For example, Novell Inc., a multinational software and services company, has a company-wide incubator program where employees are encouraged to submit new business proposals. John Dragoon, the Chief Marketing Officer, has stated that such a program "demonstrates how product development initiatives can be driven by many individuals across an organization and how a creative approach embraced by everyone within a company can ultimately play a significant role in driving market leadership" (Forbes, 2010).

One important aspect of enhancing creativity in organizations is to measure and reward creativity. For example, Zingheim and Schuster (2007) interviewed the top 20 tech firms based on three lists (Forbes, Fortune 500, BusinesWeek) and found that 80 percent of the companies used objective measures to evaluate innovation/creativity (e.g., revenue or income from new products or services, new income streams from combining capabilities to form new directions) and rewarded employees based on these measurements through cash incentives, raises and promotion. However, not every

creative process can be immediately tied to and measured by numerical standards such as financial thresholds. In such cases, the manager's subjective impression of individual creativity may replace objective measures as the basis for decisions on employee rewards.

However, there is limited research on "individual attributes, interpersonal behaviors and social cues that decision makers in organizations find salient and relevant when assessing other's creative potential or about how they use such cues" (Elsbach & Kramer, 2003). The limited research that exists has found that perceptions of creativity can be affected by various implicit theories of creativity about individuals and groups that do not always agree with more objective measures of creativity. For example, people hold gender- and race-based stereotypes about creativity that cause them to evaluate the creativity of the same output differently depending on the source (Baer & Kaufman, 2008; Kaufman, Baer, Agars, & Loomis, 2010; Kaufman, Baer, Cole, & Sexton, 2008). Further, people have the illusion that groups are more creative than the sum of individuals (or nominal groups) although there appears to be no reliable difference in the quantity and/or quality of ideas generated between the two (Paulus, Dzindolet, Poletes, & Camacho, 1993; Stroebe, Diehl, & Abakoumkin, 1992).

Adding to the challenge of perceiving creativity in an organizational setting is the fact that the work is often completed in groups. In such cases, I argue that the social setting (i.e., the group) becomes an important situational factor that influences the manager's subjective impressions. As such, the present research explores how the social context influences the assessment of creativity regarding the product and the target. First,

research on creativity stereotypes suggests that people may hold a variety of implicit (and inaccurate) theories about creativity that affect the evaluation of output. In organizational contexts, managers are typically aware of the demographic composition of groups they evaluate and I argue that this knowledge likely influences their perceptions of group performance across subjective dimensions such as creativity. More specifically, I propose that observers will use surface features of groups to infer the creativity of group output: They will expect demographically diverse groups to be more creative than homogeneous groups (when the output is both present and absent), and this difference in expectation will bias their evaluation.

Second, when managers form impressions of individual creativity based on group output, the social setting (i.e. the group) becomes an important situational factor that influences individual performance. Managers must then try to partition credit between other members in the group and the target individual. However, inferring individual responsibility from group effort is a challenging task. For example, Savitsky, Van Boven, Epley and Wight (2005) showed that members of a group often estimate their own contribution to group output in a self-serving way. Furthermore, decades of work on the fundamental attribution error has shown that people often draw on dispositional inferences while undervaluing situational factors for both individual (Gilbert & Malone, 1995; Jones & Harris, 1967; Ross, 1977) and group behavior (Allison, Beggan, Midgley, & Wallace, 1995; Allison, Mackie, & Messick, 1996; Allison & Messick, 1985). Similarly, I propose that observers will insufficiently discount individual ability when the

individual performs as part of a group and the degree to which they discount individual ability depends on the salience of the situational factor: When the target person has worked in a group but is depicted alone (i.e. weak situational salience), observers will infer the target's creativity as if that person had performed the task alone. Conversely, when the target has worked in a group and is depicted with the group, observers will partition credit between the group and the target and therefore discount individual creativity. For uncreative products, a reverse process is expected: Individuals working in a group but depicted alone will be seen as uncreative as someone who produced the same poor output alone. Blame for poor output will also be discounted when observers see the individual depicted with the group.

Chapter 2 and 3 test these ideas. Chapter 2 tests whether people have a lay theory that demographically diverse groups are more creative, and explores the consequences. In these studies, I show that people perceive demographically diverse groups as having more cognitive diversity and this in turn affects the evaluation of group output. First, they hold higher creative expectation for demographically diverse groups when diversity is salient. Next, when judges see an output from a demographically diverse group that meets their expectations, they assimilate it to their highest expectation and rate it as more creative compared to the same output from a homogeneous group, leading to a bonus in creativity assessment. However, output that does not meet their expectation is perceived to be less creative compared to the same output when it is attributed to a homogeneous group, leading to a penalty in perceived creativity.

Chapter 3 tests whether people give too much credit (and blame) to individuals when they have worked in a group but the group is not psychologically salient. In these studies, the target is evaluated for creativity based on the same group output using different evaluation contexts that differ in salience of the group (target alone vs. target within the group.) When the target is evaluated alone, I demonstrate that observers treat the evaluation process as if the target had created the output alone. On the other hand, when the target is evaluated within the group, observers discount group contribution from individual performance and this discounting affects the perceived creativity of the target in two ways: For objectively creative group output, the target is perceived to be less creative in group evaluation because some of the credit is attributed to the group for producing a successful product. For uncreative output, observers spread the blame to the group and this leads the target to be perceived as more creative in a group evaluation. In other words, when the situational cue is salient, the group acts as a buffer that takes the credit or the blame away from the target. This is either beneficial or detrimental to how the target's creativity is perceived.

In the remainder of this chapter I will first review the literature, summarizing both the general theories of creativity derived from social psychology as well as factors that affect organizational creativity. I will then discuss the need for organizational research on the perception of creativity in group contexts and propose specific biases that observers make in evaluating the creativity of both the group output and individual members.

Literature Review

Traditionally, research on creativity has focused more on what leads to creativity than on factors that affect how it is inferred or perceived. In the 1950 meeting of the American Psychological Association, Guilford (1950) used his presidential address to stress the importance of studying creativity and as a result, the first wave of creativity research was born where creativity was defined as a dichotomous category of big C (genius and eminent creativity) and little C (everyday creativity). From this crude categorization, the more contemporary researchers have identified four different aspects (or four P's) of creativity: Person, Place, Process, and Product (Kozbelt, Beghetto, & Runco, 2010). First, traditional research has focused on identifying personal traits (e.g., openness to experience and autonomy) of creativity in the domains of art and science (Barron, 1993) and the type of environmental factors (e.g., opportunity for exploration, originality valued) that promote creativity (Witt & Beorkrem, 1989). Second, research on cognitive theories of creative thinking has identified two main underlying components within a creative process: divergent thinking (Guilford, 1968) and cognitive flexibility. Divergent thinking relates to an ability to generate original and multiple solutions to a problem by thinking outside the box while cognitive flexibility involves the ability to restructure the problem in multiple ways to fit the changing demands. Working together, they help people find solutions to challenging problems (Gino & Ariely, 2012). Examples of issues addressed in this research include the comparison of cognitive mechanism between creative and noncreative thinking and the roles of conscious versus

non-conscious processes (Kozbelt et al., 2010). Moreover, various contextual factors (e.g., experience living abroad) that promote creative problem solving (Leung, Maddux, Galinsky, & Chiu, 2008; Markman, Lindberg, Kray, & Galinsky, 2007) including different cognitive (e.g., global versus local processing styles) and motivational factors that affect creativity (Förster, Friedman, & Liberman, 2004; Friedman & Förster, 2001) have been studied.

Third, as a product, creativity has also been defined as the generation of ideas that are novel and useful (Amabile, 1983; Mumford & Gustafson, 1988; Shalley, 1991; Zhou & Shalley, 2008) and several evaluative tests and techniques have been developed in an effort to measure it with objective standards. For example, the consensual assessment technique (CAT) asks participants to generate products (such as stories or poems) that are then rated by domain experts for creativity (Amabile, 1983; Baer, Kaufman, & Gentile, 2004; Kaufman et al., 2008). Other tests, like the Torrance Test of Creative Thinking (Duncker & Lees, 1945; Mednick, 1962; Torrance, 1968) or the Remote Association Test (Mednick, 1962), measure participants on verbal and math abilities.

While most of the research on creativity has been carried out with the assumption that creativity is beneficial, a rising topic of interest has been on the "dark side of creativity" that can lead to negative and malevolent outcomes. For example, creative people tend to be more arrogant (Silvia, Kaufman, Reiter-Palmon, & Wigert, 2011) and generate better lies (Walczyk, Runco, Tripp, & Smith, 2008). Furthermore, Gino and Ariely (2012) have illustrated that when creative people are motivated to behave

unethically, divergent thinking helps them generate original ways to bypass moral rules and cognitive flexibility helps to reinterpret available information to fit self-interest. As such, creative people can better justify their dishonesty, which in turn promotes cheating behavior. Next, moving beyond the basic psychology of creativity, I review the research on factors that promote organizational creativity and the need for research on how creativity is evaluated in an organizational context.

Factors that Promote Creativity in Organizations

Research has found that creativity is positively related to a number of desirable organizational outcomes, such as performance and innovation, at every level of organization. At the individual level, creativity is correlated with better performance rating (Powers & Kaufman, 2004; Scott, Leritz, & Mumford, 2004), more innovation depending on the environment (Axtell et al., 2000) and job satisfaction (Runco, 1995). Furthermore, support for the creative process leads to more innovation from groups (West & Anderson, 1996) and organizations alike (Janssen et al, 2004), and this in turn leads to better performance (Taylor & Greve, 2006).

The research on organizational creativity started to flourish in the 1980s and the main focus has been on factors that foster creativity in the work environment. For example, the componential model of creativity (Amabile, 1983, 1996) identified three factors that can promote employee creativity: domain-relevant skills, creativity-relevant process and task motivation. To summarize, one must possess not only the expert knowledge in a given domain but also the appropriate cognitive styles and strategies in

order to produce creative ideas. As the last ingredient, the model emphasizes the importance of having intrinsic and extrinsic motivation for the task at hand. In the 1990s, many comprehensive frameworks were suggested to capture variables that influence employee creativity at every level – individual, group, organizational and environmental. Most noticeably, Woodman, Sawyer and Griffin (1993) argued that creative performance is a result of different inputs of individual (e.g., cognitive style, personality, motivation), group (e.g., norm, size, diversity, cohesiveness) and organizational (e.g., culture, resource, structure, reward) factors being transformed by situational influences. Similarly, others have shown that personality scales like the Creative Personality Scale (Gough, 1979) and the Five Factor Model of Personality (Costa & McCrae, 1992) interact with contextual factors such as feedback, coworker support, supportive supervision and openness to feedback to influence creativity. In the 2000s, the social side of creativity gained popularity. For example, using the social network approach, Perry-Smith and Shalley (2003) argued that those with weak ties to their profession may be more creative because their connections outside the network can provide more creative insights.

While much is known about how to foster creative environment in organizations, there is a lack of research on situational factors that influence the subjective perception of original products and their creators. Kasof (1995) argued that this gap in knowledge is "important not only because the reception of an original product critically influences whether and to what extent the product is creative, but also because an original product's

reception may facilitate or inhibit the future production of creative works by the creator and by other potential creators" (p 314). As such, I briefly review factors that influence perception of creativity and propose several key situational factors that warrants attention in the evaluation of creativity in an organizational context.

Perception of Creativity

Due to a lack of absolute standards, evaluation of creativity is likely to be influenced by a variety of creativity stereotypes that stem from an observer's implicit theories (Sternberg, 1985, 1990). For example, Lebuda and Karwowski (2013) had participants rate the creativity of products from the domains of art and science and showed that the same artwork was rated to be more creative when it was associated with a unique last name (compared to a common last name) while the same scientific theory received a higher rating of creativity when it was thought to be generated by a male (compared to a female.) Lay theories of creativity can affect not only assessment but also acceptance of creative behavior. For example, teachers hold predisposed beliefs on characteristics that constitute students' creativity (nonconformity, impulsiveness and disruptive) that are inaccurate when compared against standardized test scores of creativity. In turn, creative students are often classified as disruptive to the class and far from their conceptualization of an ideal student (Aljughaiman & Mowrer-Reynolds, 2005; Chan & Chan, 1999). Lastly, lay theories are used pervasively even when there is no prior information about the person on which to base judgment. For example, by studying meetings where relatively unknown screenwriters pitch their ideas in

Hollywood, Elsbach and Kramer (2003) found that studio executives and producers use both dispositional and relational cues to fit screenwriters to creative prototypes in order to judge their creative potential.

A key situational factor that warrants attention in an organizational context is the social setting under which the work occurs. Since many projects in organizations are completed in groups, managers are required to not only rate the creativity of group output but also form impressions of individual performance based on this output. In such cases, I argue that the social setting (i.e. the group) influences observers' assessment of creativity of both the product and the target person. Next, I raise specific hypotheses relating to the assessment of output and the target based on established theories from social psychology.

Assessment of Group Output: Lay Theory of Diversity

Previous research has distinguished two forms of diversity (Harrison & Klein, 2007; Harrison, Price, Gavin, & Florey, 2002). Surface diversity (such as demographic diversity) often impairs individual creativity in groups because social categorization processes lead to relational divides and conflicts (Jehn, Northcraft, & Neale, 1999; Pelled, Eisenhardt, & Xin, 1999). In contrast, deep level diversity (such as cognitive diversity due to different training) promotes creativity by tapping the power of divergent expertise and perspectives (Williams & O'Reilly, 1998). I hypothesize, however, that observers do not make fine distinctions among types of diversity and hold a general theory that demographic diversity is correlated with cognitive diversity. Consistent with

this, Kurtzberg (2005) has proposed that people use demographic diversity as a cue that differences in perspectives exist among group members. Research on the hidden profile task (in which each member of a group holds some important unique information) supports this claim. Phillips, Northcraft and Neale (2006) found that members of groups with high surface level diversity perceived their information to be more unique and therefore engaged in more thorough information processing compared to members of groups with low surface level diversity.

Hypothesis 1: People hold a lay theory that demographically diverse groups have more cognitive diversity than do demographically homogeneous groups and this in turn will help demographically diverse groups to produce more creative group output.

If observers hold prior beliefs about the creative potential of groups as a function of demographic diversity, this in turn is likely to influence their expectations. For example, compared to the members in demographically homogeneous groups, those in diverse groups expect to perform better across dimensions such as creativity (van Oudenhoven-van der Zee, Paulus, Vos, & Parthasarathy, 2009). In a similar fashion, I argue that the lay theory about demographic diversity would be translated to higher expectations of creativity.

Hypothesis 2: When the demographic diversity of a group is salient, it will evoke people's lay theory of group diversity and lead them to expect more creative output from demographically heterogeneous groups than from homogeneous groups.

Furthermore, to the extent that people hold different expectations for demographically diverse and homogeneous groups, these expectations are likely to influence judgments of creativity. I propose that these expectations will lead to assimilation of expectation-consistent information and contrast of expectation-inconsistent information (Oliver, 1980; Sherif & Hovland, 1961; Wilson, Lisle, Kraft, & Wetzel, 1989). When observers see output from a demographically diverse group that meets their expectation, they will assimilate it to their high expectation and rate it as more creative compared to the same output from a homogeneous group. Conversely, when observers see output from a demographically diverse group that does not meet their expectation, they will contrast it away from their high expectation and perceive the output to be less creative than the same product from a homogeneous group.

Hypothesis 3a: The same creative group output will be rated as more creative when it is attributed to a demographically diverse group (via assimilation to high expectation), leading to a bonus in perceived creativity of group output.

Hypothesis 3b: The same uncreative group output will be rated as less creative when it is attributed to a demographically diverse group (via contrast from high expectation), leading to a penalty in perceived creativity of group output.

Assessment of Target: The Attribution Error in Perceived Individual Creativity

Although behavior is a function of the person and the situation (Heider, 1982; Lewin, 1951), people often rely too heavily on dispositional explanations and neglect situational factors as the causes of behavior. This tendency to draw on dispositional

inference, which has been termed the fundamental attribution error (Ross, 1977; Ross & Nisbett, 1991) or the correspondence bias (Gilbert & Malone, 1995), was demonstrated in a classic study by Jones and Harris (1967). The study asked participants to read an essay on Fidel Castro, the president of Cuba, and rate the essayists' true attitude toward him. As expected, they inferred strong pro- and anti-Castro attitudes when they were informed that essayists freely chose a position to show support or not. However, participants made similar inferences about essayists even when they knew that essayists did not have a choice and were randomly assigned to a position. Over the years, the literature has repeatedly demonstrated the robustness of this effect. For example, Gilbert and Jones (1986) had participants give behavioral orders to actors on various political questions that were either self-generated or from the experimenter. They found that participants inferred correspondent attitudes not only when the participants caused the actor to behave as the experimenter requested but also when the participants generated the questions.

Similar to how observers of individual behavior are likely to assume too much correspondence between behavior and disposition, Allison and colleagues (Allison et al., 1995; Allison et al., 1996; Allison & Messick, 1985; Allison, Worth, & King, 1990) showed that observers of group behavior are also likely to assume correspondence between group decisions and members' dispositional characteristics even though the group's decision is a function of members' attitudes, structural properties and decision rules. For example, Allisson and Massick (1985) had participants infer the attitudes of Montana voting citizens based on information about the outcome of a fictitious Montana

recall election. To do this, participants were given two types of information: the actual percentage of the voters who supported the recall and the minimum percentage of voter support needed for the recall attempt to succeed (i.e. the decision rule), which was varied across conditions. The results showed that participants perceived voters as being more in favor of the recall when a given percentage of voter support exceeded the required threshold than when the same percentage was described as below the requirement.

In an organizational context, the social setting in which the work occurs is an important situational cause of individual performance (Jones, 1986). For example, when employees work in teams on major projects, the group becomes the situational factor that managers need to consider when inferring individual performance based on group output. While the aforementioned studies on group attribution concerned ways in which a group decision affects the observer's impressions of everyone in the group, this context differs in that observers are required to partition credit of the group output between the situation (i.e., the group) and the individual to infer the target person's creativity. Under such a paradigm, decades of research on the FAE suggests that observers will insufficiently discount individual ability when the individual performs as part of a group.

To understand the tendency for dispositional inferences, Gilbert and Osborne (1986) proposed a model where observers went through three stages to infer the behavior of others: categorization of behavior, characterization of actor, and correction for situation. Similar to anchoring and adjustment, observers identified the behavior ("Min is acting nervous"), drew dispositional inferences ("Min is a nervous person") and corrected

these inferences based on situational information in which the behavior occurred ("Min is probably more nervous than usual because he is about to give an important presentation".) The key feature of this model was that the three stages varied in the amount of cognitive load required for processing: the first two stages were relatively simple and effortless whereas the correction stage demanded more cognitive load. By the principle of least effort, observers quickly formed dispositional impressions and insufficiently corrected behavior for situation. Previous studies have shown that observers who lack cognitive resources or motivation display the correspondence bias. For example, Gilbert, McNulty, Giuliano and Benson (1992) showed that when the behavior was made obscure by distorting its visual or acoustical parameters, observers spent more cognitive effort in interpreting and characterizing the behavior of the actor from the video or the audio tape and made more correspondent inferences as a result. Moreover, Webster (1993) demonstrated that high need for cognition is associated with deeper analytic processing whereas high need for cognitive closure motivates people to terminate analytic processing. Therefore, observers who are low in need for cognition and high in need for cognitive closure are more likely to display correspondent inferences due to insufficient correction of the initial dispositional attribution.

As described, observers are likely to take the simplest cue available to infer behavior unless the situational context is made clear for processing. In this regard, previous studies have shown that observers pay more attention to situational cues when the situational salience is increased. For example, Choi and Nisbett (1998) tested the

correspondence bias across cultures (American and Korean) using the same attitude attribution paradigm (Jones & Harris, 1967). As expected, all participants displayed the correspondence bias regardless of culture even when they knew that essayists were randomly assigned to, rather than chose, a position to either support or defend capital punishment. However, in their second study, they increased the situational salience by assigning participants to write essays prior to judging an essay written under the same condition. In this scenario, Korean participants showed a decrease in correspondence bias when they went through the same experience the essayists had. Moreover, Moore, Swift, Sharek and Gino (2010) had participants make admission decisions to an MBA program based on clear and quantified information about the behavior (student GPA) and the situation (grading leniency: average GPA of the university.) When the average GPA of the university increased for a given student GPA, participants discounted the grading leniency more from the nominal performance.

When observers form impressions of individual creativity based on group output, one way of increasing the situational salience is to visually manipulate whom the target person is evaluated with. Previous research has shown that visual manipulation of situational salience can alter patterns of attribution (Storms, 1973). When the target is known to have worked in a group but is evaluated alone, I argue that observers will focus on the dispositional characteristics of the target as the basis for perceived creativity and therefore credit the target as if that person alone has made the product. Since the target is being rated for group output, this is an error in attribution. On the other hand, when the

target is rated with the presence of other members in the group, I argue that observers will partition credit between the group and the target.

This difference in giving credit is similar to other cognitive psychological research on partitions. Previous research on partition dependence has found that judged probabilities of the same event can vary depending on how the partition is framed. For example, Fox and Rottenstreich (2003) had participants answer one of these two questions: "What is the probability that Sunday will be hotter than any other day next week" or "What is the probability that the hottest day of the week will be Sunday?" While the first question facilitates a two-fold partition (Sunday hotter, Sunday not hotter), the second question facilitates a seven-fold partition (Sunday is the hottest day of the week, Monday is the hottest day of the week, etc.) As such, participants' judgments in each case were biased toward the corresponding frame.

In similar fashion, visual manipulation of whom the target is evaluated with can highlight different partitions. In a four-person group, individual evaluation is likely to elicit a simple two-fold (target and rest of the group) partition where the target person receives sole creativity credit for the group output, leading to an error in attribution. On the other hand, group evaluation can facilitate a four-fold partition, leading to a rational discounting of individual creativity.

Hypothesis 4: When observers infer individual creativity based on group output, visual manipulation of evaluation context can elicit the fundamental attribution error: When the target is evaluated alone, observers will credit the target as if that person had

produced the output alone, leading to an error in attribution. When the target is evaluated with others in the group, observers will partition credit between the situation (the group) and the target, leading to a discount of individual performance.

In turn, I argue that the discounting of individual performance in a group evaluation context can either benefit or hurt the target's perceived creativity depending on the objective quality of the group output. With creative output, I expect to see a discounting of credit in how people perceive one's creativity with the presence of others. With uncreative output, I expect a symmetric pattern of discounting blame: one's *lack* of creativity would be discounted with the presence of others because observers would attribute the blame to the group. In other words, the presence of others acts as a buffer for individual credit or blame as the group becomes an additional target for attribution.

Hypothesis 5a: For producing objectively creative group output, observers will spread the credit and the target will be perceived to be less creative when he is evaluated with the group (compared to when he is evaluated alone.)

Hypothesis 5b: For producing objectively uncreative group output, observers will spread the blame and the target will be perceived to be more creative when he is evaluated with the group (compared to when he is evaluated alone.)

In the next two chapters I will present the results from six studies that tested the aforementioned hypotheses on both the evaluation of group output in demographically diverse group (Chapter 2) and on perceived individual creativity in group settings (Chapter 3.)

Chapter 2. The Diversity Bonus and Penalty in Assessment of Group Output

2.1 Study 1

In Study 1, participants were shown a photo of a demographically diverse or homogeneous group and told that the people in the photo were a design group that created logos for a logo design contest. Participants reported how creative they expected logos to be from the design group, and then rated the creativity of three logos attributed to the group. All participants saw the same three logos which were pre-tested to be high in creativity. In order to manipulate the salience of demographic diversity, subjects were asked to provide ratings of gender and race diversity based on the group photo either at the beginning of the study (before forming expectations and rating logos) or at the end of the study. I predicted that participants would expect the demographically diverse group to be more creative when diversity was salient (Hypothesis 2) and, as a result, the same logos would be rated to be more creative when they were assigned to the diverse group as a result of assimilation to the high expectation (Hypothesis 3a.)

Method

Participants. Six-hundred twenty-nine participants (339 females, 290 males) from an online pool (Age: $M = 28.63$, $SD = 4.89$) were randomly selected to one of four conditions in a 2 (Group diversity: Diverse vs. Homogeneous) X 2 (Remind diversity: Yes vs. No) between-subject design.

Instructions and procedures. Participants were told to imagine that they were a manager at a design firm and that they would be evaluating a design group across various dimensions. After reading the introduction, they were shown a photo of either a demographically diverse or homogeneous group of four industrial designers.

As shown in Figure 1, four types of homogeneous group photos were taken: four Asian females, four Asian males, four Caucasian females and four Caucasian males. Next, two demographically diverse groups of four were created by selecting individuals from the homogeneous groups in new combinations consisting of one Asian female, one Asian male, one Caucasian female, and one Caucasian male. In comparing between each homogeneous and heterogeneous group, there always was one person who appeared in both homogeneous and diverse group photos and this person will be referred to as the *target person* for the remainder of the paper. This allowed us to measure perceptions of individual creativity with the same target person in different group compositions.

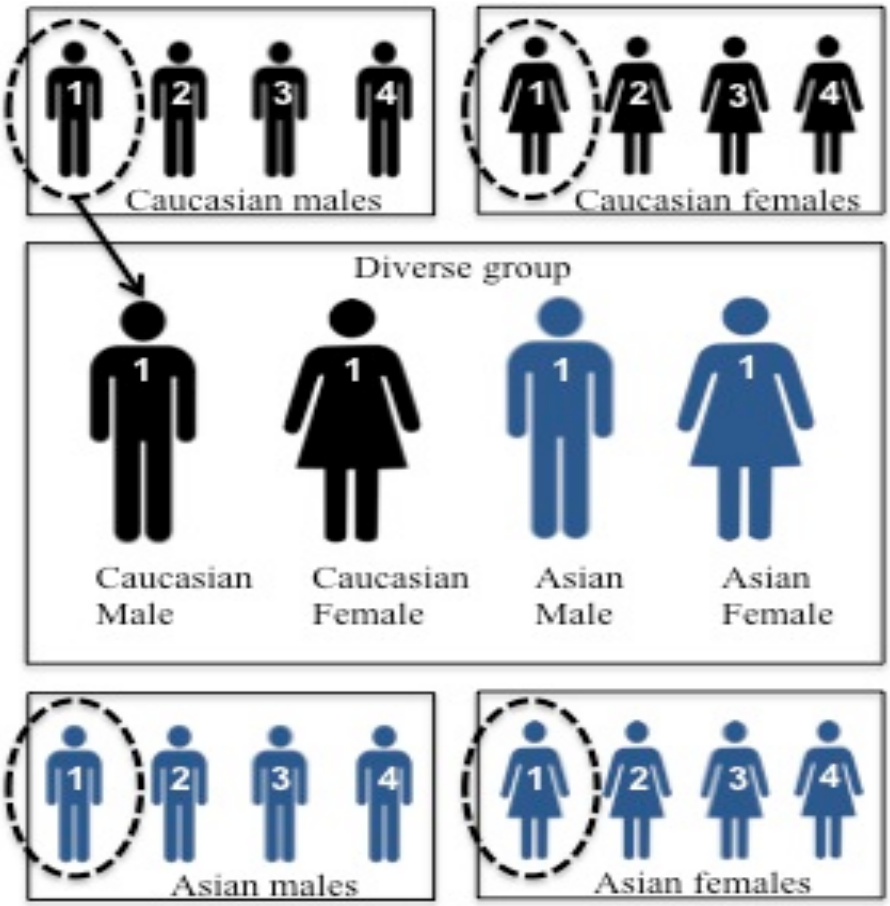

Figure 1: Summary diagram of the four homogeneous and diverse groups with the target person (denoted by the dotted circle) in both groups

All pictures were also rated by a separate group of participants. As desired, there was a significant difference between diverse and homogeneous group pictures on dimensions related to diversity (gender and race) but not on dimensions unrelated to diversity (attractiveness.)

Participants were informed that the group of industrial designers in the photo created company logos for its next project. In the high-salience condition, participants rated group diversity on demographic dimensions (gender and race) using a 7-point scale

(1 = *not diverse*, 7 = *very diverse*) at the beginning of the study whereas participants in the low-salience condition rated these dimensions at the end of the study. These ratings were designed to make group diversity salient in the high-salience condition and also served as a manipulation check[1].

Next, all participants provided an expected creativity rating for the group by indicating how creative they expected the group's logos to be on a 100-point scale (0 = *not creative*, 50 = *moderately creative*, 100 = *very creative.*) After indicating their expectation, participants used the same scale to rate three company logos attributed to the group in counter-balanced orders. Ten actual company logos (consisting of words and pictures) selected from online were rated by a separate group of participants in a pre-test. Three logos with similar and high rating of creativity were selected as stimuli (Appendix A.)

After rating the logos, participants were told that the target person in the photo was a candidate for a position in their design firm and were asked to rate the perceived creativity of the target person based on the logos that he or she created as a part of the group. They were informed that everyone in the group contributed equally. Participants used the same 100-point creativity scale as before. Lastly, they indicated on a 100-point

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[1] A 2 (Group Diversity: diverse vs. homogeneous) X 2 (Remind diversity: yes vs. no) ANOVA on ratings of diversity confirmed that people perceived the diverse group photos as more diverse across dimensions of gender, $F(1, 625) = 1582.14$, $p < .0001$, and race, $F(1, 625) = 662.73$, $p < .0001$. There was no significant interaction between reminding diversity and group diversity for both ratings of diversity, $F(1, 625) < 1.0$, $p =$ ns

scale (0= *not likely to hire*, 100= *very likely to hire*) how likely they would be to hire the target person.

Results

Previous research on creativity stereotypes has found only weak evidence for gender or race bias in creativity assessment (Kaufman, Baer, et al., 2010; Kaufman, Niu, Sexton, & Cole, 2010). Consistent with these past results, there was no significant difference in measured variables between the four homogeneous groups, $F(3, 310) < 1$, $p = ns$, so all remaining results were aggregated.

Expected creativity. A two (Group Diversity: diverse vs. homogeneous) X 2 (Remind diversity: Yes vs. No) between-subject analysis of variance (ANOVA) on expected creativity revealed a main effect of group diversity (diverse: $M = 72.10$, $SD = 17.48$; homogeneous: $M = 65.74$, $SD = 20.6$), $F(1, 625) = 7.44$, $p = .007$, and this effect was qualified by the predicted interaction with reminding diversity, $F(1, 625) = 7.39$, $p = .007$. When participants rated diversity at the beginning of the study and degree of diversity was made salient, demographically diverse groups were expected to be more creative ($M = 73.38$, $SD = 16.74$) than homogeneous groups ($M = 63.14$, $SD = 20.34$); this difference in expected creativity was much smaller when diversity was not salient (diverse: $M = 70.7$, $SD = 18.22$; homogeneous: $M = 68.46$, $SD = 20.59$) and this provided support for Hypothesis 2.

Average logo creativity. The same 2 (Group Diversity: heterogeneous vs. homogeneous) X 2 (Remind diversity: Yes vs. No) between-subject ANOVA was

performed on the average creativity ratings of the three logos since the Cronbach's alpha was 0.8. It yielded a main effect of group diversity (diverse: $M = 60.99$, $SD = 17.57$; homogeneous: $M = 57.03$, $SD = 18.69$), $F(1, 625) = 7.11$, $p = .008$, but as predicted, the effect of diversity was qualified by a significant interaction between group diversity and reminding diversity, $F(1, 625) = 5.47$, $p = .02$ (see Fig. 2.) As predicted by Hypothesis 3a, when participants rated the demographic diversity of the group before rating the logos (and therefore were aware of the group diversity), they rated the logos attributed to the demographically diverse group as more creative than the same logos attributed to the homogeneous group. When diversity was not made salient, participants rated the logos as similar in creativity for both groups.

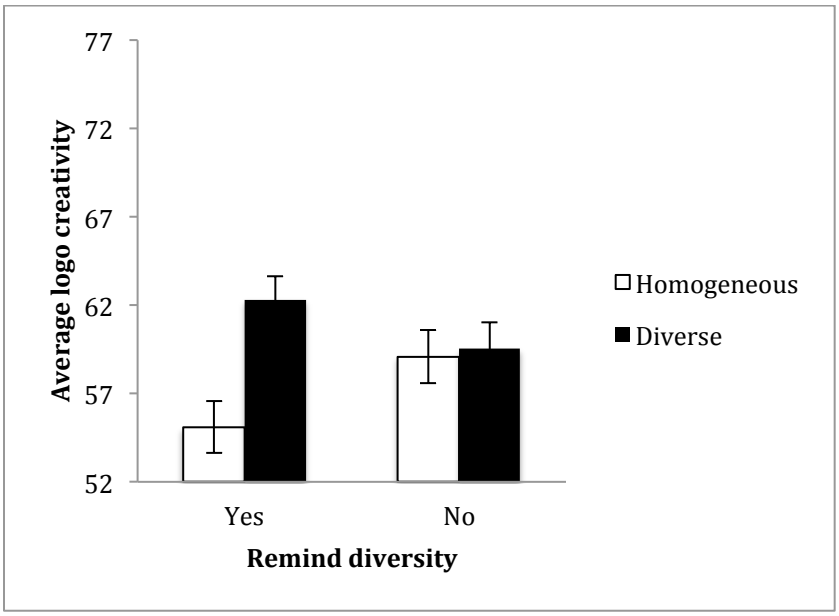

Figure 2: The average rating of logo creativity as a function of group diversity and reminding diversity

Perceived target creativity. The same 2 (Group Diversity: heterogeneous vs. homogeneous) X 2 (Remind diversity: Yes vs. No) between-subject ANOVA was performed on perceptions of target person's creativity, yielding a main effect of group diversity (heterogeneous: $M = 63.19$, $SD = 18.42$; homogeneous: $M = 60.03$, $SD = 19.39$), $F(1, 625) = 4.16$, $p = .042$, and a significant interaction between group diversity and reminding diversity, $F(1, 625) = 5.26$, $p = .022$ (see Fig. 3.)

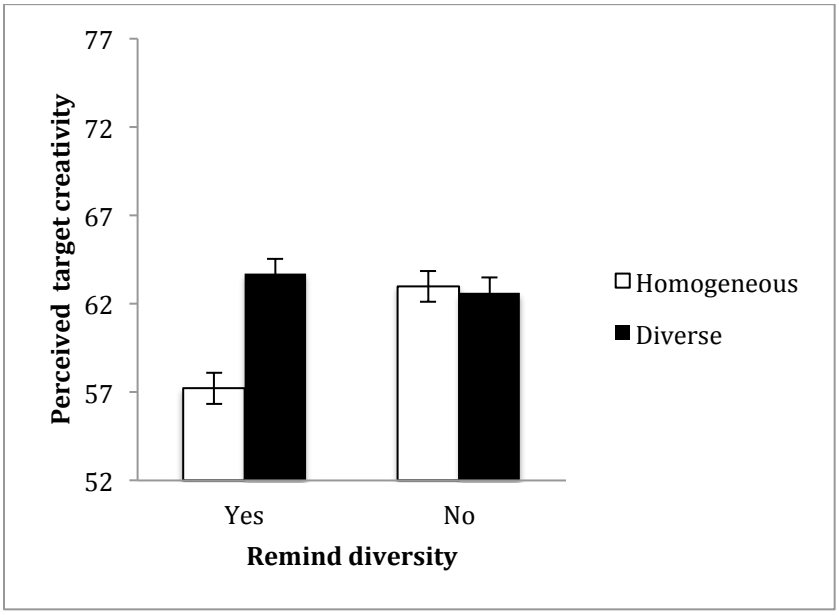

Figure 3: Perception of target creativity as a function of group diversity and reminding diversity

Hiring intention. The same 2 (Group Diversity: heterogeneous vs. homogeneous) X 2 (Remind diversity: Yes vs. No) between-subject ANOVA performed on hiring intention revealed a marginally significant effect of group diversity (heterogeneous: $M = 63.62$, $SD = 21.09$; homogeneous: $M = 60.54$, $SD = 20.39$), $F(1, 625) = 3.18$, $p = .075$,

and a significant interaction between group diversity and reminding diversity, $F(1, 625) = 5.51$, $p = .02$ (see Fig. 4.)

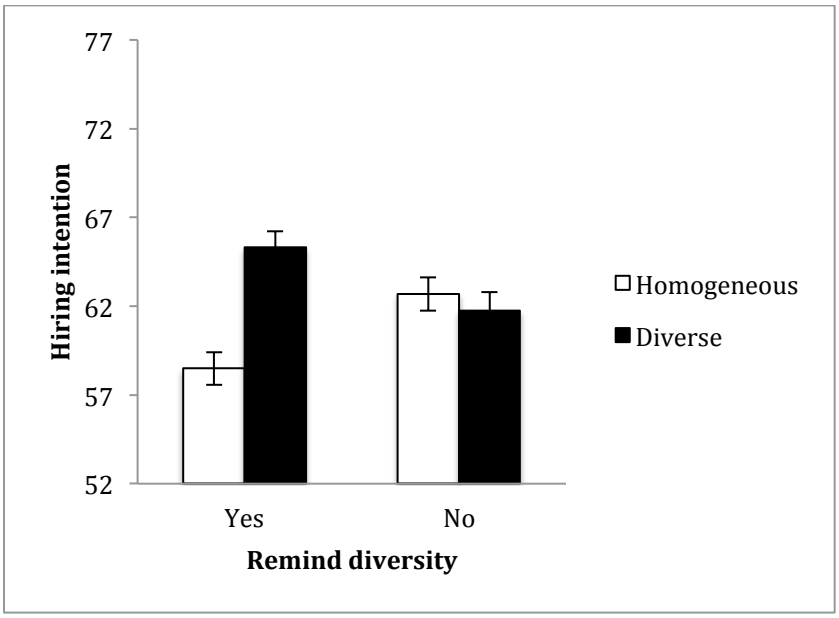

Figure 4: Hiring intention of the target as a function of group diversity and reminding diversity

In assessing both individual creativity and hiring intention, participants rated the target person in the diverse group to be more creative and more likely to be hired compared to the same person in the homogeneous group when the group diversity was reminded; this difference was greatly reduced when group diversity was not reminded.

2.2 Study 2

Study 1 showed that when demographic diversity is salient, people expected diverse groups to be more creative, and then assimilated creative logos to that expectation.

Study 2 was designed to build on Study 1 in several ways. First, Study 2 was designed to make diversity salient in a more subtle way. Unlike Study 1, Study 2 asked for ratings of diversity only at the end of the study as a manipulation check. To make diversity salient in a more implicit way, subjects were presented with two groups simultaneously: one diverse and one homogeneous. I expected that evaluating the groups side-by-side would make diversity automatically salient. Next, in order to explore the mechanism behind the diversity bonus effect, participants answered a questionnaire designed to measure two aspects of the group process. First, they were asked about the cognitive diversity of the group. I predicted that the demographically diverse group would be perceived as having more cognitive diversity (Hypothesis 1.) However, an alternative explanation of the bonus observed in Study 1 also existed: Observers would hold a more favorable impression of the demographically diverse group in general and this halo effect in turn would lead to higher creativity evaluation. To address this concern, participants also answered questions about other group qualities such as group affect (e.g., how they feel about each other) and group execution (e.g., how well they meet work deadlines). I predicted that observers would perceive the demographically diverse group as having more cognitive diversity but see no difference in other group qualities compared to homogeneous groups, and only the difference in perceived cognitive diversity would mediate the effect of demographic diversity on the evaluation of group output.

Method

Participants. One-hundred fifty-one participants (81 males, 70 females) from an online pool (Age: $M = 38.13$, $SD = 8.14$) were randomly assigned to one of two conditions (Group diversity: Diverse vs. Homogeneous) between-subject design[2].

Instructions and procedures. In the beginning, participants were told that they would be judging a company logo created by a group of industrial designers (Out of three highly creative company logos used in Study 1, the "martini house" logo was selected for this study.) Next, to make demographic diversity salient, they were shown a photo of demographically diverse group and a photo of homogeneous group. While the same four homogeneous group photos from Study 1 were used, different sets of people were used to form two diverse groups (Appendix D.) All pictures were rated by a separate group of participants and yielded significant differences on dimensions related to diversity (gender and race) and no differences on dimensions unrelated to diversity (attractiveness.)

Next, one of the two group photos was randomly chosen and participants answered questions about this group. First, they were asked to rate the logo that the group created on three dimensions using a 9-point scale: usefulness (1 = *not useful*, 5 = *moderately useful*, 9= *very useful*), novelty (1 = *not novel*, 5 = *moderately novel*, 9 = *very novel*) and creativity (1 = *not creative*, 5 = *moderately creative*, 9 = *very creative.*) Second, they rated the group on cognitive diversity on four items (Cronbach's alpha=0.87) and other group qualities on five items (Cronbach's alpha= 0.89) on a 9-

[2] Similar to Study 1, four homogeneous and two diverse group photos were used (which were later aggregated) and the original study design had six cells with 25 subjects in each cell.

point scale (Appendix E). Lastly, as a manipulation check, participants rated diversity of both groups on demographic dimensions (gender and race) using a 9-point scale (1 = *not diverse*, 5 = *moderately diverse*, 9 = *very diverse.*)[3]

Results

As in Study 1, there was no significant difference in measured variables between the four homogeneous groups, $F(3, 74) < 2.0$, $p = ns$, so all remaining results were aggregated.

Overall creativity rating. The overall creativity rating was computed by averaging usefulness, novelty and creativity of the logo since the Cronbach's alpha was 0.81. A one-way (Group diversity: diverse vs. homogeneous) between-subject ANOVA on the overall creativity rating revealed an expected main effect of group diversity, $F(1, 149) = 8.69$, $p < .001$, with the same logo being rated as more creative when it is attributed to the demographically diverse group ($M = 7.01$, $SD = 1.51$) compared to the homogeneous group ($M = 6.22$, $SD = 1.77$).

Group Process. Since participants provided measures of both cognitive diversity and other group qualities, a 2 (Group diversity: diverse vs. homogeneous) X 2(Group process items: cognitive diversity vs. other group qualities) mixed ANOVA was performed with the first factor manipulated between-subject and the second factor within-

[3] A one-way (Group diversity: diverse vs. homogeneous) within-subject ANOVA on ratings of diversity revealed that participants saw the diverse group photos as more diverse across dimensions of gender, $F(1, 362) = 683.18$, $p < .001$, and race , $F(1, 362) = 475.33$, $p < .001$.

subject. The ANOVa revealed a main effect of the group process items, $F(1, 296) = 57.91$, $p < .001$, with participants giving a higher score on other group qualities ($M = 6.32$, $SD = 1.51$) compared to the ratings of cognitive diversity ($M = 5.71$, $SD = 1.75$). As predicted, the ANOVA also yielded a significant interaction, $F(1, 296) = 28.07$, $p < .001$. Consistent with Hypothesis 1, the demographically diverse group ($M = 6.06$, $SD = 1.73$) was perceived to have more cognitive diversity compared to the homogeneous group ($M = 5.38$, $SD = 1.73$), $F(1, 296) = 11.57$, $p < .001$, while participants saw no difference in other group qualities between the diverse ($M = 6.41$. $SD = 1.52$) and homogeneous group ($M = 6.24$, $SD = 1.50$), $F(1, 296) < 1.0$, $p =$ ns.

Meditation. Both cognitive diversity and other group qualities were separately tested as mediators for the direct effect of demographic diversity on perceived creativity of group output, but only cognitive diversity significantly mediated this relationship. As shown in Figure 5, the indirect effect is positive ($ab > 0$) and the 95% confidence interval (10,000 bootstrap samples) excludes zero (Preacher & Hayes, 2004). The ratio of the indirect to the total effect, $ab/(ab + c')$, is 46%, suggesting that cognitive diversity explains a significant portion of the diversity effect. The mediation also indicates a remaining direct effect of demographic diversity.

Participants who rated a demographically diverse group indicated that this group had more cognitive diversity compared to those who rated a homogeneous group and the difference in perceived cognitive diversity in turn led to higher creativity ratings when the same logo was attributed to the diverse group. In other words, participants believed

that members of diverse group had more perspectives and could brainstorm more unique ideas for the logo compared to the homogeneous group and this belief led them to evaluate the output from the diverse group as more creative. The alternative explanation that a halo effect would lead to higher scores of creativity was ruled out as participants did not hold more favorable impression of the diverse group on other group qualities such as group affect and execution.

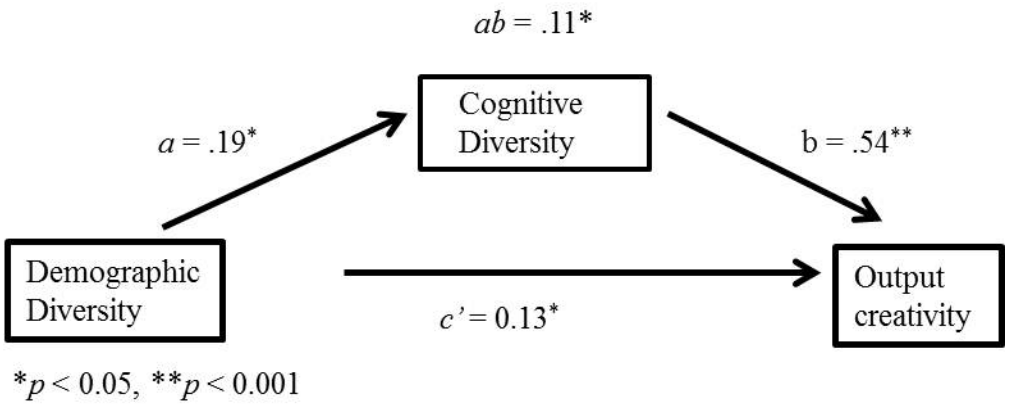

Figure 5: Mediation model in Study 2

2.3 Study 3

Study 3 builds on the first two studies in the following ways. First, while Study 1 and Study 2 only included logos that were perceived as creative and interesting, Study 3 included both a highly creative and an uncreative logo. I expected to replicate the finding from the first two studies that a highly creative logo from the diverse group would be seen as more creative than the same logo attributed to homogeneous groups (Hypothesis 3a.) In addition, I wanted to test whether an uncreative logo from the heterogeneous group would show a contrast effect. I expected that, due to high expectations and clear

disconfirmation, a dull and uncreative logo attributed to a diverse group would actually be rated as less creative than the same logo when it was attributed to a homogeneous group (Hypothesis 3b.)

Second, Study 1 asked all participants to rate expected creativity for the design group in advance of judging the logos. I wanted to test whether forming an explicit expectation was a necessary intervening step in the predicted patterns of assimilation and contrast for heterogeneous groups. In Study 3, half the subjects were asked to rate expected creativity after seeing the groups but before judging the logos; the other half were not asked to rate expected creativity. I could then test whether the predicted pattern of assimilation and contrast would hold even in the absence of forming an explicit expectation. Finally, in line with the traditional research on creativity (Amabile, 1996), I used a broader measure of creativity by asking subjects to rate novelty, usefulness, and creativity as three separate measures.

Method

Participants. One-thousand two-hundred forty-one participants (612 males, 629 females) from an online pool (Age: $M = 34.53$, $SD = 7.72$) were randomly assigned to one of eight conditions in a 2 (Group diversity: Diverse vs. Homogeneous) X 2 (Logo type: Highly creative vs. Uncreative) X 2 (Formed expectation: Yes vs. No) between-subject design.

Instructions and procedures. Participants were told that they would be judging company logos created by two groups for a design contest and were shown one photo of a

demographically diverse group and one photo of a homogeneous group. While the same homogeneous group photos from Study 1 were used, different sets of people were used to form two diverse groups (Appendix D.) All pictures were rated by a separate group of participants and yielded significant differences on dimensions related to diversity (gender and race) and no differences on dimensions unrelated to diversity (attractiveness.)

In the formed expectation condition, participants were asked to rate the expected creativity for the logo designed by each group across three dimensions on a 7-point scale: usefulness (1 = *not useful*, 4 = *moderately useful*, 7= *very useful*), novelty (1 = *not novel*, 4 = *moderately novel*, 7 = *very novel*) and creativity (1 = *not creative*, 4 = *moderately creative*, 7 = *very creative.*) For completeness, I asked participants in the no-expectation condition near the end of the experiment to recall how useful, novel and creative they initially expected the logos to be when they first saw the group photos.[4]

Next, participants rated a logo from each group on usefulness, novelty and creativity using the same scale. In one condition, the highly creative logo was assigned to the demographically diverse group and the uncreative logo was assigned to the homogeneous group with the opposite assignment in the other condition. The order in which they rated the logos was counterbalanced. Through a pre-test of 15 logos, two logos were selected, one that received the highest rating of creativity and the other that

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[4] As in Study 1, subjects expected the diverse group to be more creative than the homogeneous group. This pattern held when expectations were reported early in the study (after seeing the group photos but before seeing the logos) or recalled at the end of the study (all *p*s < .001).

received the lowest (Appendix B.) Lastly, as a manipulation check, participants rated diversity of both groups on demographic dimensions (gender and race) using a 7-point scale (1 = *not diverse*, 7 = *very diverse.*)[5]

Results

Two things are noted for the analysis. First, in addition to the three between-subject factors described above (the demographic diversity of the group photo, the objective quality of the logo and when they provided expectations of creativity for each group), our study design also yielded a within-subject factor because each participant provided a rating of expectation and logo creativity for both the diverse and homogeneous group, resulting in two responses per measure. To avoid interpreting a four-way ANOVA, we focused on the first response that each participant provided. Since the order in which participants rated the diverse and homogeneous groups was counterbalanced, analyzing the first responses provided a pure between-subject analysis of the two measures; note that a more complex analysis adding a within-subject variable for the second logo yielded identical conclusions. Second, similar to Study 1, the four homogeneous groups were aggregated after confirming that participants perceived no

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[5] A 2 (Group Diversity: diverse vs. homogeneous) X 2 (Logo Type: highly creative vs. uncreative) X 2 (Formed Expectation: yes vs. no) between-subject ANOVA on ratings of diversity revealed that participants saw diverse group photos as more diverse across dimensions of gender, $F(1, 1233) = 2571.31$, $p < .0001$, and race , $F(1, 1233) = 1163.63$, $p < .0001$. There were no significant interactions between independent variables, $F(1, 1233) < 1.0$, p = ns.

difference in creativity ratings across the different homogeneous groups, $F(1, 1233) < 1.0$, ns.

Overall creativity rating. The overall creativity rating was computed by averaging usefulness, novelty and creativity of the logo since the Cronbach's alpha was 0.91. A 2 (Group Diversity: diverse vs. heterogeneous) X 2 (Logo Type: highly creative vs. uncreative) X 2 (Formed Expectation: yes vs. no) between-subject ANOVA on the overall creativity rating revealed an expected main effect of logo type, $F(1, 1233) = 672.68$, $p < .0001$, with the highly creative logo being rated more highly ($M = 5.1$, $SD = 1.4$) than the uncreative logo ($M = 3.12$, $SD = 1.32$) and an unexpected main effect of forming a creativity expectation, $F(1, 1233) = 11.83$, $p < .001$, such that participants who formed an expectation gave a higher rating of creativity ($M = 4.24$, $SD = 1.7$) than those who did not ($M = 4.03$, $SD = 1.66$.)

The main effect of logo type was qualified by a significant interaction between group diversity and logo type, $F(1, 1233) = 23.06$, $p < .0001$ (see Fig. 5.) Replicating the pattern in Study 1, participants rated the highly creative logo as more creative when it was attributed to the demographically diverse group than to the homogeneous group, consistent with assimilating expectation-consistent output to a high expectation. As predicted by Hypothesis 3b, however, participants rated the uncreative logo as less creative when it was attributed to the diverse group than to the homogeneous group, consistent with contrasting expectation-inconsistent output away from a high expectation. This interaction held regardless of whether subjects formed an expectation about group

creativity before or after evaluating the logos. Specifically, the interaction between logo type and diversity in Figure 6 held when subjects formed an initial expectation, $F(1, 599) = 10.81$, $p < .001$ and when they did not, $F(1, 634) = 12.30$, $p < .001$. Demographically diverse groups received a creativity bonus for a highly creative logo and a creativity penalty for an uncreative logo even when participants formed no initial expectation. Lastly, the three-way interaction was not significant, $F(1, 1233) < 1.0$, p = ns.

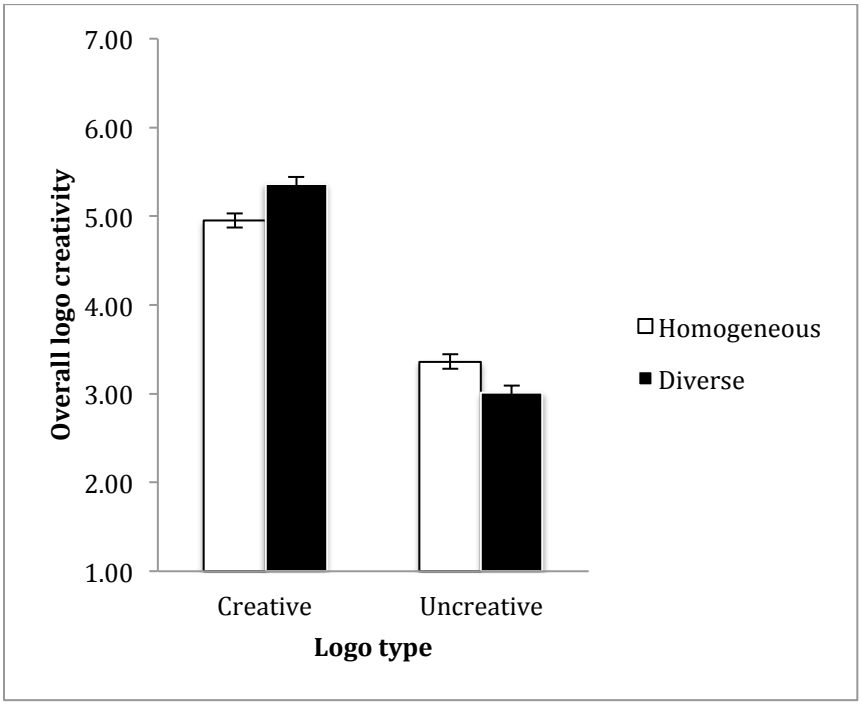

Figure 6: Overall rating of logo creativity as a function of group diversity and logo type

2.4 Study 4

The first three studies have shown that a lay theory of diversity affects the evaluation of group output when demographic diversity is made salient to the observer.

Study 4 was an exploratory study designed to extend this lay theory to perceptions of the individual member in a diverse group. Unlike Study 1 that looked at the spill-over effect of group evaluation to perceptions of individual group members, Study 4 studied the direct consequence of being featured in a diverse group for how individual members are perceived by observers.

Similar to the previous studies, participants in this study were shown a photo of either demographically diverse or homogeneous group and there was one person (i.e., the target person) who appeared in both group photos. Participants were further told that the company logo was made by this target person alone and made judgments about his creativity. In this setup, two competing hypotheses are proposed: A rational account predicting that observers should subtract out any information about the group and perceive no differences in individual creativity on the product attributed to the individual working alone. However, the group's demographic diversity could also influence the evaluation of the target. In this case, I expected that a lay theory of diversity would spill over to the individual member in the group and the target person would receive more positive evaluation of creativity when shown in a diverse group even though the output was based on individual effort. Furthermore, similar to Study 2, I predicted that the target person would be perceived as personally possessing more cognitive diversity when featured in a diverse group and this in turn would influence the rating of target creativity.

Method

Participants. One-hundred ninety-nine participants (98 males, 101 females) from an online pool (Age: $M = 36.70$, $SD = 8.98$) were randomly assigned to one of four conditions in a 2 (Group diversity: Demographically diverse vs. Homogeneous) X 2 (Logo type: Highly creative vs. Uncreative) between-subject design.

Instructions and procedures. To make degree of demographic diversity salient, participants were first shown a photo of an industrial design group that was either demographically diverse or homogeneous and they rated this group on gender and racial diversity on a 9-point scale (1 = *not diverse*, 5 = *moderately diverse*, 9 = *very diverse.*) The two group photos from Study 1 were used where the same person appeared in both diverse and homogeneous group. Participants were informed that this group creates company logos together or individually depending on the project and that they would be answering questions about the target person. In the next screen, they were shown either a creative or uncreative company logo, told that the target person created this logo alone and rated this person's creativity on a 100-point scale (1= *not creative*, 50 = *moderately creative*, 100= *very creative*). Next, items from Study 2 were adapted that asked participants to rate cognitive diversity and other personal qualities of the target person (Appendix F).

Results

Target person creativity. A two (Group Diversity: diverse vs. heterogeneous) X 2 (Logo Type: highly creative vs. uncreative) between-subject ANOVA on the target person creativity yielded a main effect of group diversity, $F(1, 195) = 4.90$, $p = .03$, with

the same person being rated as more creative when he was shown in a demographically diverse group (M = 61.33, SD = 24.28) compared to a homogeneous group (M = 54.82, SD = 23.58), and a main effect of logo type, $F(1, 195) = 58.75$, $p < .001$, with the same person being rated as more creative for producing a creative logo (M = 69.65, SD = 19.96) than an uncreative logo (M = 46.68, SD = 22.45). The interaction was not significant, $F(1, 195) < 1.0$, $p =$ ns.

Cognitive diversity of target person. The four cognitive diversity items were averaged since Cronbach's alpha was 0.88. The same ANOVA on the target person's cognitive diversity yielded a same pattern of result: a main effect of group diversity, $F(1, 195) = 3.57$, $p = .05$, with the same person being perceived as having more cognitive diversity when he was shown in a demographically diverse group (M = 5.59, SD = 1.65) than a homogeneous group (M = 5.19, SD = 1.35), and a main effect of logo type, $F(1, 195) = 8.82$, $p < .01$, with the same person being rated as having more cognitive diversity for producing a creative logo (M = 5.72, SD = 1.42) than an uncreative logo (M = 5.08, SD = 1.56). Again, the interaction was not significant, $F(1, 195) < 1.0$, $p =$ ns.

Other personal qualities. The four personal quality items were averaged since Cronbach's alpha was 0.89. The same ANOVA on the target person's other personal qualities yielded a main effect of group diversity, $F(1, 195) = 4.93$, $p = .03$, and this means participants viewed the same person as more favorable across personable dimensions (e.g., "how much do you think members of this group like him?") when he was shown in a demographically diverse group (M = 6.43, SD = 1.42) than a

homogeneous group ($M = 6.01$, $SD = 1.31$). The main effect of logo type and the interaction were not significant, $F(1, 195) < 1.0$, $p =$ ns.

Mediation. Both cognitive diversity and other personal qualities were separately tested for meditation on the direct effect of demographic diversity on perceived target creativity and they were both significant[6]. As such, both were tested together in a structural equation model with each factor as independent path that mediates the direct effect of demographic diversity on perceived target creativity and only the path with cognitive diversity remained significant. The ratio of the indirect to the total effect, ab/(ab + c′), is 70% and cognitive diversity alone accounts for 92% of this mediated effect.

As shown in Figure 7, participants who rated the target in a demographically diverse group indicated that he had more cognitive diversity compared to those who rated the same person in a homogeneous group and the difference in perceived cognitive diversity of the target in turn led to higher individual creativity rating. In other words, participants believed that the target possessed more perspectives and could brainstorm more unique ideas for the logo alone as a result of being surrounded by a diverse set of people and this belief led them to evaluate the target as more creative. Although observers also viewed the target as more favorable on other personal qualities when

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[6] The ratio of the indirect to the total effect, ab/(ab + c′), is 66% in a mediated model with cognitive diversity as a single mediator and the ratio of the indirect to the total effect, ab/(ab + c′), is 48% in a mediated model with other personal qualities as a single mediator.

featured in a diverse group, this difference only accounted for a small and insignificant portion of the mediated effect.

Results indicate that a lay theory of diversity can influence impressions of the individual in the diverse group and there are two possible explanations for this. First, simply surrounding the target with demographically diverse group members (who were previously found to be more creative as a group) could have made the target appear more creative and therefore the mere presence of demographic diversity could have primed creativity. Second, observers could have held a more elaborate theory about individual creativity in a diverse group. They could have believed that an individual benefits by interacting with a diverse group of people or that the type of person who self-selects into a diverse group holds more creative traits. The current study does not offer a clear conclusion about the cause of this effect. Future studies will be needed to separate a simple priming explanation from an explanation based on inferences about how individual's differ when they are members of diverse or homogeneous groups.

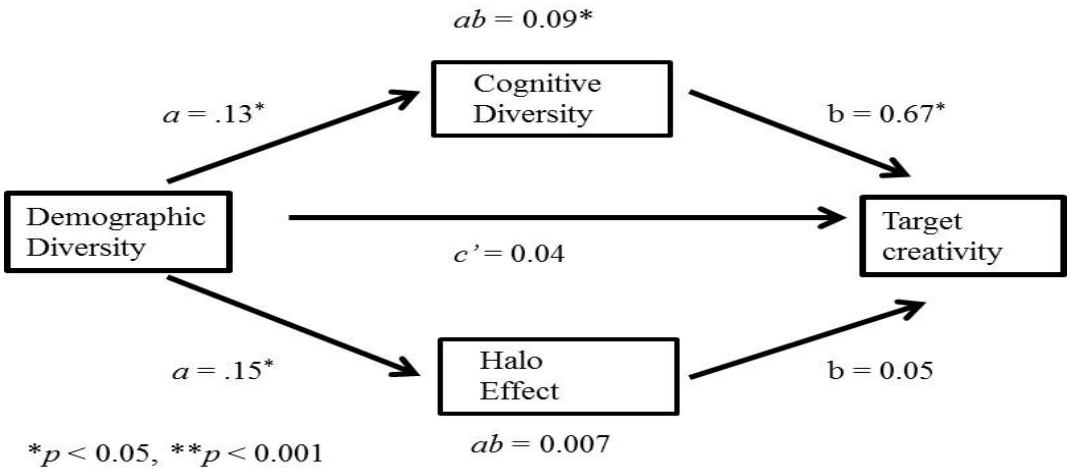


Figure 7: Mediation model in Study 4

Chapter 3. Credit and Blame for Creative Performance in a Group Setting

3.1 Introduction

Chapter 2 and Chapter 3 fit under the large umbrella of investigating the effects of social setting on perception of creativity but differ in their focuses. Studies in Chapter 2 tests people's lay theory that demographically diverse groups are more creative and demonstrates how the knowledge about demographic composition influences an observer's perception of creativity. While the focus of Chapter 2 has been on the lay theory of diversity, Chapter 3 explores how observers form impression of individual creativity based on group output. Previous research has showed that allocating individual responsibility from group output is a challenging task. For example, Savitsky, Van Boven, Epley and Wight (2005) demonstrated that members of a group often estimate their own contribution to group output in a self-serving way.

In line with this, Chapter 3 aims to provide evidence that observers of the group can also commit biases when inferring individual creativity from group work when the group contribution is not psychologically salient to the observer. For example, Steve Jobs was widely regarded as a creative genius. He had a great eye for elegant design and seamless integration. Everyone knows that he invented the iPhone, the iPod, and the Mac. Of course such a claim is fundamentally wrong. Sophisticated products must have required the effort of many, and the genius of Apple was a system – rather than an

individual – that sought and generated ideas and then engineered ways to have them work together. Thus, one needs to consider not only Steve Jobs' personal creativity, but also the situational factors (such as the creative contributions received from many others like Jonathan Ive, the senior vice president of industrial design at Apple) to explain Jobs' success. However, average consumers may make direct inferences about Jobs' creativity based on their impressions of the iPhone without considering the role played by countless contributors such as Ive. This tendency is consistent with many past studies on the fundamental attribution error or the correspondence bias (Gilbert & Malone, 1995; Ross, 1977), which demonstrate how people often rely too heavily on dispositional explanations to the neglect of situational factors as the causes of behavior.

The social influence in judgment of creativity warrants attention because many major projects require the effort of groups. In such settings, understanding how observers partition creativity credit between the target person and the group warrants attention because impressions of individual creativity can have significant implications for the organization. For example, when people outside the company saw Jobs as Apple's only idea man, it upset Jonathan Ive because that made them "vulnerable as a company" (Isaacson, 2011). His assertion was later confirmed when Apple stocks dwindled as a function of Jobs' struggling health in the later years of his tenure as CEO (Collingwood, 2009).

The present research adds value to the literature by exploring the effect of the social context in a subjective assessment of individual creativity. Two studies were

designed where participants rated the creativity of the target alone or with other members of the group. In Study 5, participants rated Jonathan Ive's creativity based on either a photo of him alone or a photo of him within a group of Apple designers. For designing the same creative Apple products, they were predicted to discount his performance and rate him as less creative when he evaluated in a group context compared to being rated alone. Study 6 built on Study 5 by using objectively creative (e.g., a well-designed and interesting company logo) and uncreative (e.g., a clearly dull and unimaginative company logo) group output. I predicted that observers' perceptions of the target creativity in a group evaluation will cost the target when the output is objectively creative (via the spreading of credit) and benefit the person when the output is clearly disappointing (via the spreading of blame.)

3.2 Study 5

In Study 5, participants were asked questions about Jonathan Ive's creativity for the Apple products that he and his team designed. In answering these questions, they were either shown a photo of Jonathan Ive either alone or in a group with members of the actual design team (Appendix G.) This allowed us to measure people's perception of his creativity with or without the presence of others in the group. For the team photos, the demographic diversity of the team was also varied to create homogeneous (four Caucasian males) and heterogeneous (Asian female, Asian male, Caucasian female, Caucasian male) teams.

With the three different photos of Jonathan Ive (one individual photo and two team photos), two predictions were made. Firstly, for designing the same Apple products which are generally regarded as innovative, participants would rate him as less creative when he was assessed in a group because the presence of others would increase the situational salience and observers would partition creativity credit between the group and the target (Hypothesis 5a).

Next, two types of group photos were used. In Study 1, observers rated the target as more creative for the same group output when he or she was a part of a demographically diverse group compared to a homogeneous group. However, participants in that study first evaluated the logo as a function of group diversity which in turn affected the rating of the target (i.e., group diversity → perceived creativity of group output → perceived target creativity). In this study, instead of rating the group output, participants were given a score to hold constant their beliefs about the creativity of group output and thereby study the direct effect of group diversity on perceived target creativity (i.e. group diversity → perceived target creativity). In such cases, I predicted that the two group photos would not elicit a difference in perceived creativity of Jonathan Ive. However, I predicted that there would be a significant difference between each type of group photo when compared to the individual photo, which would demonstrate the robustness of the visual salience effect.

Method

Participants. One-hundred seventy-four participants (95 females, 79 males) from an online pool (Age: $M = 40.35$, $SD = 8.72$) were randomly assigned to see one of three photos: Ive alone vs. Ive in a demographically diverse group vs. Ive in a demographically homogeneous group.

Instructions and procedures. Participants were told that since 1996, Jonathan Ive has been head of the Apple design team that is responsible for designing major Apple products such as the iPod, iPhone, iPad, MacBook Pro, MacBook Air and iMac. As such, it was implied that these gadgets are products of a group effort. Next, they were shown one of three photos (Appendix G). Participants in the weak visual salience condition were shown a photo of Jonathan Ive alone while those in the strong visual salience condition were shown a photo of Jonathan Ive in a four-person group with either demographically diverse or homogeneous group members. From the actual Apple design team, which consists of 16 people, three members were selected based on their demographics: three Caucasian males for the demographically homogeneous group and an Asian female, an Asian male and a Caucasian female for the diverse group. Every participant indicated that they knew who Jonathan Ive was prior to participating.

With the photo, participants were asked how creative Jonathan Ive was based on the design of Apple products over the last decade on a 100-point scale (0 = *not creative*, 50 = *moderately creative*, 100 = *very creative*). As another measure of individual creativity, they were also asked how creative he would be if he were to work on a project designing the next major Apple product by himself. While the first measure of creativity

allowed them to evaluate his creativity with or without the presence of others, the second measure forced people in every condition to isolate his individual creativity from the team. Next, those who saw the demographically diverse or homogeneous group photos were asked to rate the team in terms of gender and race on a 7-point scale (1 = *not diverse*, 4 = *moderately diverse*, 7 = *very diverse)*. As expected, there was a significant difference in perceived diversity on dimensions of gender (diverse: $M = 5.32$, $SD = 1.39$; homogeneous: $M = 2.05$, $SD = 1.76$), $F(1, 140) = 150.19$, $p < 0.0001$, and race (diverse: $M = 4.92$, $SD = 1.42$; homogeneous: $M = 2.32$, $SD = 1.89$) ,$F(1, 140) = 86.04$, $p < 0.0001$. Lastly, they were asked how much they liked Apple products on a 7-point scale (1 = *I do not like Apple products at all*, 7 = *I like Apple products very much*) and there was no difference between conditions, $F(1, 171) < 1.0$, p = ns.

Results

As predicted, there was no difference in rating of the measures between the two group conditions so they were aggregated, $F(1,140) < 1.0$, p = ns.

Perceived individual creativity. A one-way (Visual salience: Target alone vs. Target in a group) between-subject analysis of variance (ANOVA) on the first creativity measure revealed a significant main effect of visual salience, $F(1, 172) = 5.07$, $p = .03$. As predicted, for designing the same list of innovative Apple products, Jonathan Ive was rated to be significantly more creative when participants saw a photo of him alone ($M = 89.84$, $SD = 12.6$) than when he was in a group ($M = 80.74$, $SD = 22.04$).

Perceived creative potential. Next, the same ANOVA was performed on the second measure of target creativity (perceived creative potential) and it also yielded a main effect of visual salience, $F(1,172) = 8.87$, $p < .01$, such that participants believed Jonathan Ive would be more creative in designing the future Apple product by himself when he was shown by himself ($M = 79.22$, $SD = 18.79$) than in a group ($M = 65.92$, $SD = 23.62$).

Using an example from the real world, this study demonstrated that observers change their perception of individual creativity based on group output as a function of the visual salience of the group. For the designs of same Apple products, Jonathan Ive was perceived to be less creative when he was assessed in a photo that included other members of his design team. Furthermore, participants who evaluated his creativity with the presence of others continued to use the initial impression in attributing his potential creativity in a future project by himself. Lastly, although the two group photos did not elicit a difference in perceived creativity, there was a significant difference between each type of group photo when compared to the individual photo, which showcased the robustness of the visual salience effect.

3.3 Study 6

Study 5 displayed that observers perceive the target creativity differently when situational salience is manipulated visually. Study 6 was designed to build on Study 5 in several ways. First, participants in Study 5 made creativity attributions with the knowledge that Apple products are created by teams. An interesting benchmark against

which to compare attributions in a team context is the attribution that would be made to an individual working alone. As such, Study 6 used unfamiliar company logos as the output, which could then be credited to either a single person or a group. This created a benchmark against which to precisely measure discounting in perceived individual creativity and I predicted that there would be no difference in the creativity rating of the target between this benchmark and when the output is attributed to a group as long as the target is shown alone. In other words, I predicted that observers would credit the target as if that person had produced the group output alone when he is evaluated alone (Hypothesis 4). Second, since Apple products are generally regarded as innovative, Study 3 could test attributions for just creative output. Study 6 extended this original focus by asking people's perception of one's creativity for both creative and uncreative output. Similar to Study 5, with creative output, I expected to see a discounting of credit in how people perceive one's creativity with the presence of others (Hypothesis 5a). With uncreative output, I expected a symmetric pattern of discounting blame: one's *lack* of creativity would be discounted with the presence of others because observers would attribute blame to the group (Hypothesis 5b). Lastly, two group photos were used again to demonstrate the robustness of the visual salience effect. In sum, in terms of visual salience, Study 6 included the three conditions in Study 5 where observers rated the target on group output based on one of three photos (target alone, target in a demographically diverse group and target in a homogeneous group) along with an

additional condition where observers rated the same target based on the assumption that the target person had created the product alone.

Method

Participants. One-thousand two-hundred thirty-six participants (622 males, 692 females) from an online pool (Age: $M = 38.61$, $SD = 8.61$) were randomly assigned to one of 12 conditions in a 4 (Visual salience: Target alone on individual output vs. Target alone on group output vs. Target in a demographically diverse group on group output vs. Target in a demographically homogeneous group on group output) X 3 (Logo Type: no logo vs. highly creative logo vs. uncreative logo) between-subject design.

Instructions and procedures. In this study, participants were either told that a group of four industrial designers or a single designer had created a company logo for a design contest. Next, they were shown three items: the photo of the industrial designer or the group, the logo that he or they created and a score that it received from the panel of judges from the contest.

Participants in the benchmark condition were told that the logo was created by the target alone and were shown a corresponding photo of the target. Next, participants in the other three conditions were informed that the logo was created by a group of designers and were shown different photos of the target. Similar to Study 5, those in the weak visual salience condition were shown a photo of the target alone while those in the strong visual salience were shown a group photo that was either demographically diverse or homogeneous with the target (Appendix H.) The three photos were created with the

same Caucasian appearing in all three: the target person alone, target person in a demographically homogeneous group (four Caucasian males) and a diverse group (Asian female, Asian male, Caucasian female and Caucasian male.) All pictures were rated by a separate group of participants and yielded significant differences on dimensions related to diversity (gender and race) and no differences on dimensions unrelated to diversity (attractiveness.)

In terms of the group output, there were three conditions. In the control condition, participants were informed that the group or the target shown in the previous screen had created a company logo but the participants were not shown an actual image of the logo. Thus, their judgment was only based on the photo of the target or the group. Participants in the other two conditions were shown either a highly creative logo or an uncreative company logo as the output and the same logos from Study 3 were used. Lastly, to hold constant the observers' impression of the group output, they were given a score for the creative (90 out of 100) and uncreative (40 out of 100) logos.

Based on the output, participants were asked the same two questions of creativity as in Study 5. Firstly, they were asked how creative they thought the target person was on a 100-point scale (0 = *not creative*, 50 = *moderately creative*, 100 = *very creative*). As another measure of individual creativity, participants (except for those in the benchmark condition) were also asked how creative the target would be if he were to design another company logo by himself. While the first measure of creativity allowed them to evaluate

target creativity with or without the presence of others, the second measure forced people in every condition to isolate his individual creativity from the team.

Results

Perceived target creativity. A 4 (Visual salience of the group: Target alone on individual output vs. Target alone on group output vs. Target in a demographically homogeneous group on group output vs. Target in a demographically diverse group on group output) X 3 (Logo Type: No logo vs. Highly creative logo vs. Uncreative logo) between-subject ANOVA on perceived target creativity revealed an expected main effect of visual salience where group and individual photos of the target person yielded different ratings of creativity (Target alone on individual output: $M = 56.42$, $SD = 26.10$; Target alone on group output: $M = 59.01$, $SD = 23.76$; Target in a diverse group: $M = 62.92$, $SD = 18.37$; Target in a homogeneous group: $M = 59.37$, $SD = 18.87$), $F(3, 1224) = 6.67$, $p < .001$), and a main effect of logo type where the objective quality of the output affected how observers perceived the target person's creativity (no logo: $M = 60.85$, $SD = 18.33$; highly creative: $M = 68.47$, $SD = 20.08$; uncreative: $M = 50.17$, $SD = 21.42$;), $F(2, 1227) = 118.20$, $p < .001$.

The key prediction of this study was an interaction between visual salience and logo type. As predicted, this interaction was significant, $F(6, 1227) = 12.49$, $p < .001$ (see Fig. 6.) Simple contrasts revealed a significant difference in perceived creativity between the four visual salience conditions for the highly creative, $F(3, 1224) = 5.81$, $p < 0.001$, and uncreative logo, $F(3, 1224) = 24.03$, $p < 0.001$, but not when participants did

not see a logo, $F(3, 1224) = 1.63$, p =ns. As such, planned contrasts of visual salience were performed in the two conditions where participants saw an image of either a highly creative or an uncreative logo.

Compared to being rated alone for the highly creative logo, participants rated the target person as *less* creative when he was shown in a demographically diverse, $F(1, 1224) = 3.74$, $p = .05$, or homogeneous group, $F(1, 1224) = 13.32$, $p < .001$ (Hypothesis 4a.) The same person suffered further by being in a homogeneous group compared to a diverse group, $F(1, 1224) = 3.91$, $p = .04$. Lastly, there was no difference in perceived creativity between the benchmark condition where the output was attributed to the target alone and the weak visual salience condition where the output was attributed to the group, $F(1, 1224) < 1.0$, p = ns. In other words, as Hypothesis 4 predicted, when participants were shown a photo of the target alone, they rated the target as if the target had created the output alone even though they were informed that the highly creative logo was made by the group.

In contrast, for the uncreative company logo, the target person was rated to be *more* creative when shown in either a diverse, $F(1, 1224) = 29.99$, $p < .001$, or homogeneous group photo, $F(1, 1224) = 23.24$, $p < .001$, than when the participant viewed the photo of the target person alone (Hypothesis 5b). However, the same person did not benefit further by being in a diverse group when compared to a homogeneous group, $F(1, 1224) < 1.0$, p = ns. Lastly, there was no difference in perceived creativity between the benchmark condition and the weak visual salience condition when the output

was attributed to the target alone or when the output was attributed to the group, $F(1, 1224) < 1.0$, p = ns. Again, Hypothesis 4 was confirmed and participants rated the target as if the target had created the output alone even though they were informed that the uncreative logo was made by the group.

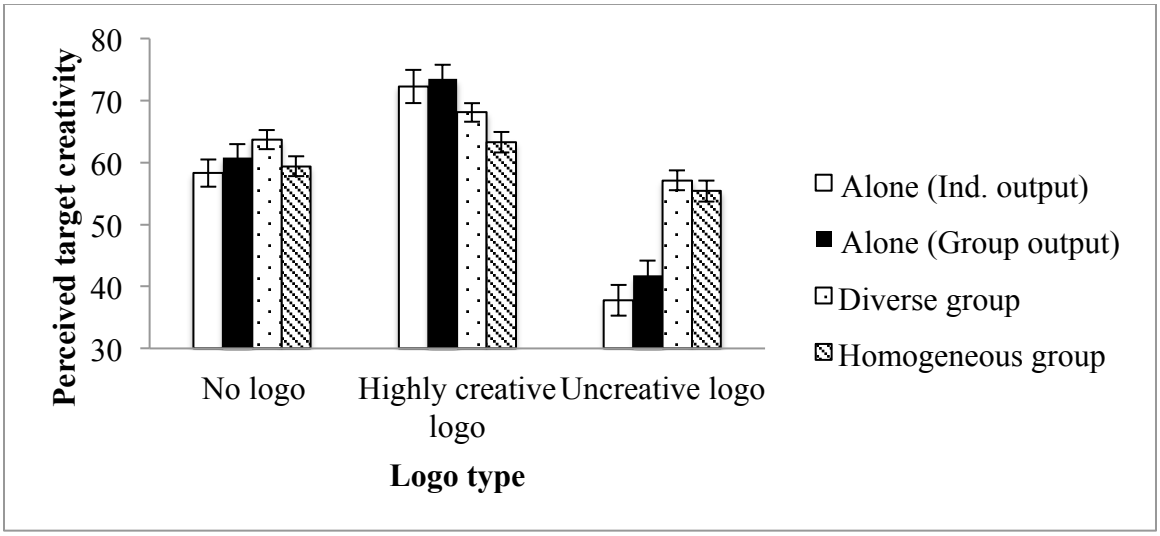


Figure 8: Perceived creativity of the target as a function of visual salience and logo type

Perceived creative potential. The same ANOVA on the perceived creative potential of the target yielded a similar pattern of results: a marginally significant main effect of visual salience (Target alone on individual output: $M = 59.82$, $SD = 24.10$; Target alone on group output: $M = 60.07$, $SD = 23.10$; Target in a diverse group: $M = 63.01$, $SD = 18.71$; Target in a homogeneous group: $M = 60.08$, $SD = 19.67$), $F(3, 1224) = 2.35$, $p = .07$, and a main effect of logo type (highly creative: $M = 68.16$, $SD = 19.81$;

uncreative: $M = 52.63$, $SD = 20.97$; no logo: $M = 61.99$, $SD = 19.20$), $F(2, 1224) = 79.59$, $p < .001$.

As Figure 9 shows, there was also a significant interaction between visual salience and logo type, $F(6, 1227) = 7.39$, $p < .001$. Simple contrasts revealed a significant difference in perceived creative potential of the target between the four visual salience conditions for highly creative, $F(3, 1224) = 4.84$, $p < 0.01$, and uncreative logo, $F(3, 1224) = 10.99$, $p < 0.001$, but not when participants did not see a logo, $F(3, 1224) = 1.23$, $p =$ns.

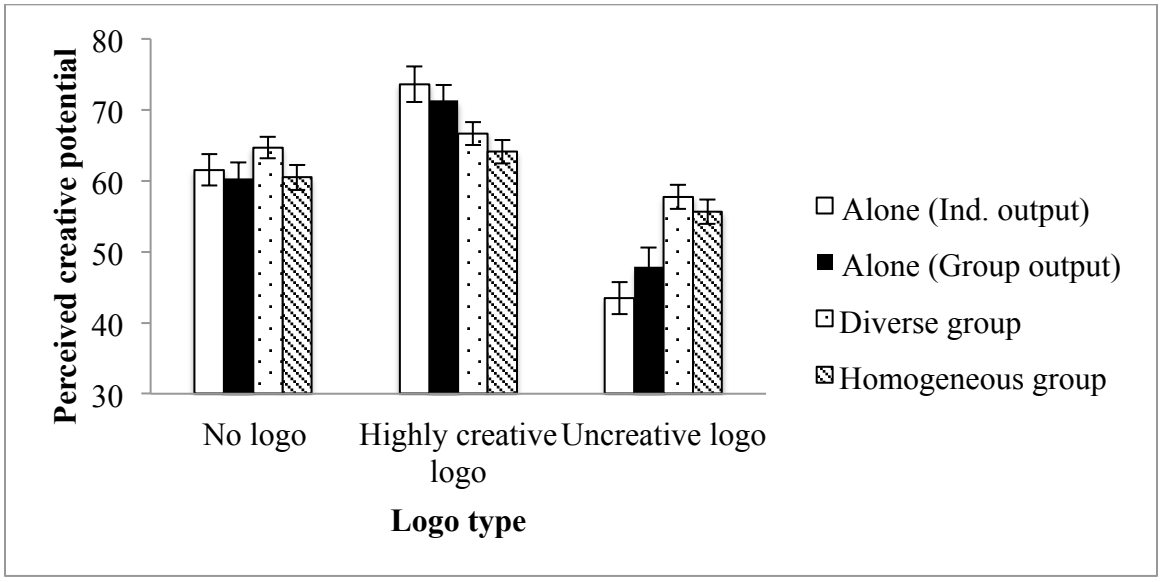


Figure 9: Perceived creative potential of the target on a future project as a function of visual salience and logo type

When participants were asked to attribute the target's creativity on a future project by himself, they displayed the same credit and blame for creative performance: For the highly creative logo, being featured in either a demographically diverse, $F(1, 1224) =$

2.74, $p = .05$, or homogeneous group, $F(1, 1224) = 6.54$, $p = .01$, led to a *lower* rating of creative potential. On the other hand, for the uncreative logo, being featured in either a demographically diverse, $F(1, 1224) = 11.90$, $p = .001$, or homogeneous group, $F(1, 1224) = 7.21$, $p < .01$, lead to a *higher* rating. Lastly, for both types of logos, participants again showed no difference in their beliefs about the target's creative potential between the two conditions when output was attributed to either the target or the group, $F(1, 1224) < 1.0$, $p =$ ns. In other words, they largely ignored the effort of other group members and gave sole credit to the target when the target was featured alone.

The study yielded two key results. First, depending on the quality of group output, participants attributed less credit or the blame to the target individual when the group presence was made salient (via the group photo), thereby discounting the extremity of the target person's ability. Second, when observers were merely informed that the target was being rated for group output and shown a photo of the target alone, they failed to discount the situational factor and perceived his creativity as if the target was solely responsible for the group output.

Chapter 4. Discussion and Conclusion

4.1 General Discussion

The present research demonstrated that the group setting influences how observers evaluate the creativity of output and target. Although demographic diversity is inconsistently related to cognitive diversity in direct empirical tests (Bell, Villado, Lukasik, Belau, & Briggs, 2011), Study 2 demonstrated that people have a lay theory that demographically diverse groups have more cognitive diversity and this in turn influences the creativity assessment of group output. As predicted, people expected demographically diverse groups to be more creative, and their assessment of creativity depended on how well a group's output matched expectations. The first three studies showed that demographically diverse groups receive a bonus for creative output (a highly creative company logo) – their product was rated as more creative than the same product attributed to a homogeneous group. But Study 3 also showed that diverse groups are penalized for uncreative output (an uncreative company logo) that failed to meet the high expectations.

It is important to note that the lay theory tested in Chapter 2 was specifically about how a group's demographic diversity influences the creativity assessment of group output. As an extension, Study 1 and Study 4 explored how this lay theory influences perceptions of an individual member in a diverse group. First, Study 1 investigated implications of the biased assessment by having participants first evaluate the group output (i.e. the creative logo) as a function of group diversity and then the target person

(i.e., group diversity → perceived creativity of group output → perceived target creativity). In such cases, observers continued to use favorable impressions of the diverse group to assess the individual: The same person was judged to be more creative and more worthy of being hired in a diverse group. Second, rather than studying individual creativity as the spill-over effect from group perceptions, Study 4 had observers make judgments about individual creativity based on the group photo at the beginning of study (i.e., group diversity → perceived target creativity) and demonstrated that merely being featured in a diverse group made observers believe that the same target person possessed more cognitive diversity even though the target was evaluated for individual work. Furthermore, mediation analysis revealed that this difference in perceived cognitive diversity of the target in turn positively influenced the assessment of target creativity.

There could be two possible reasons for this observed effect of membership in a diverse group on perceptions of individual creativity. First, the simple surrounding of demographically diverse group members (who were previously found to be more creative as a group) could have primed diversity and made the target appear more creative. Second, observers could have held a more elaborate theory about individual creativity in a diverse group. For example, observers could have believed that the target benefited by interacting with a diverse group of people although the target was evaluated for individual work. Alternatively, they could have believed that the type of person who self-selected into a demographically diverse group possessed more creative traits. In sum,

while the results in Chapter 2 show initial support for the idea that people's lay theory of diversity can influence evaluation of individual creativity, further research is needed to systematically explore the mechanism behind the observed effect.

Next, the second half of this research investigated a different question of how a team setting influences perceptions of creativity. Chapter 3 demonstrated that asking about the same person's creativity led to different answers as a function of whom the target is shown with, and this biased perception of creativity either benefited or cost the target, depending on the objective quality of group output. In Study 5, compared to being featured with other members of his team, Jonathan Ive was rated to be more creative when he was depicted alone, even though it was clear both involved the design of the same Apple products. In other words, Ive's ability was discounted when he was evaluated with other members because visual salience of the group members reminded observers that the group also deserved some credit for the innovative designs. Lastly, using two group photos that varied on demographical diversity of group members, the robustness of the visual salience effect was observed as there was a significant difference between each type of group photo when compared to the photo of Jonathan Ive alone.

Study 6 built on this by demonstrating that the presence of others affects perception of creativity differently depending on the objective quality of the output. With a highly creative company logo, the target was rated to be more creative when he was shown alone compared to being featured in a group. With an uncreative company logo, the opposite pattern emerged: The target person was rated to be less creative when he was

shown alone compared to being featured in a group. In other words, by hiding the group, the target received an undeserved bonus individually for a creative product and an underserved penalty for an uncreative product. The presence of group members acted as a buffer that not only became an additional source for credit when the output was objectively creative but also a target for spreading the blame when the output was below the expectation.

Furthermore, Study 6 used an output that could be attributed to either an individual alone or the group and the perceived target creativity was compared between the two conditions. When observers were informed that the target was being rated for group output and shown a photo of the target alone, they failed to discount the situational factor and perceived his creativity as if the target was solely responsible for the group output.

4.2 Future Research

While the results in Chapter 2 show initial support for a lay theory of diversity on perceived creativity, there are number of possible areas for further research. First, one can test new implications of people's lay theory that demographic diversity leads to creativity by studying how people assemble a creative workforce. For example, participants can pretend to be managers at a firm charged with a task of forming a creative think tank and one can observe the demographic diversity of the assembled team based on a list of possible candidates that possess similar skillsets but different demographics. Second, there may be several moderators of the diversity effect. For

example, observers with a positive attitude toward diversity (Homan, Greer, Jehn, & Koning, 2010; Homan, Van Knippenberg, Van Kleef, & De Dreu, 2007) may be especially likely to expect greater creativity from diverse groups. Another possible moderator is the timing of when group diversity information is presented relative to the experience (i.e. the logo). Previous studies have assumed a top-down process where conceptual information influences expectations which in turn affect subjective interpretation of a stimulus. For example, Coke was rated higher when participants consumed the beverage from a cup with the brand logo rather than an unmarked cup (McClure et al., 2004). Similarly participants in Study 1 and 3 were always shown a group photo first, formed their expectations (either implicitly or explicitly) based on group diversity and rated the group output. However, they could have also seen the group photo *after* seeing the logo and this could have tested whether expectation can influence the retrospective interpretation of the experience. In this regard, Lee, Frederick and Ariely (2006) mixed regular beer with balsamic vinegar and had participants taste this new beer in three conditions: a blind condition, in which the additive was not informed, and two disclosure conditions where the addition of vinegar was mentioned either before or after tasting the beer. They found that the beer was liked much less when the disclosure preceded the tasting (compared to the blind and disclosure-after condition), suggesting that expectations affect experience rather than modifying retrospective interpretation of the experience.

Third, future research can look at the boundary conditions for the effect of lay theories on diversity. For example, since some creative tasks may benefit more from coordination, motivation, and persistence than from diversity, demographically homogeneous groups, which are regarded as more cohesive and cooperative (Mullen, Johnson, & Salas, 1991; Williams & O'Reilly, 1998) may be perceived as more effective on those tasks. Moreover, when a product is meant to appeal to a specific segment of a market (e.g., African American hair product), a homogeneous group that represents this segment may be perceived as being more effective in making the product. Furthermore, different types of diversity may be perceived to be better equipped for specific tasks. For example, if the target customers for a product are made up of people with one mix of backgrounds, the corresponding mix may be perceived to be more effective than an equally diverse mix that does not match the target customers.

Lastly, the downstream consequence of making judgments based on lay theory also warrants attention. For example, does a manager continue to hold more favorable impression of the diverse group after making creativity evaluation? If the next output from the diverse group turned out to be objectively poor in quality but the manager continues to hold more favorable impression for the diverse group, this would imply that the decision maker does not sufficiently adjust for the counter evidence and holds implications for employees who can strategically place themselves in a diverse group which is likely to receive more benefit through positive evaluation.

4.3 Theoretical Implications

This research contributes to the creativity literature by answering Kasof's (1995) call to identify key situational factors that can influence the perception of creativity output and the creator. More specifically, this research extends the understanding of how the social setting influences perception of creativity in two ways. First, in addition to previous work that showed people hold lay theories on personal traits such as gender and race, this research adds to the literature by showing that group level attributes such as demographic diversity can also influence perception of creativity. Chapter 2 demonstrated that observers hold a lay theory on demographic diversity and this biases the evaluation of group output. In addition, it also explored the mechanism behind this effect by showing that diverse groups are believed to possess more cognitive diversity and this in turn affects evaluation of group output. Lastly, it showed that lay theory can positively influence the individual perceptions in a diverse group.

Second, adding to the work by Savitsky, Van Boven, Epley and Wight (2005) which showed that members of a group often estimate their own contribution to group output in a self-serving way, Chapter 3 provided evidence that observers of the group are also prone to biases in inferring individual contribution from group work. Although the target was evaluated for group output, observers committed the fundamental attribution error and gave sole credit to the target as if the target had created the work alone when the situational salience was weak. This work adds to the FAE literature by showing that other members in the group can act as a situational factor when inferring individual

creativity based on group output and that the situational salience can be manipulated visually by showing the target alone or with the rest of the group.

4.4 Practical Implications

The research on how group creativity is perceived as a function of demographic diversity has practical implications for businesses, schools, and other organizations. Observers, such as managers and teachers, are typically aware of the demographic composition of groups that they have to evaluate and this knowledge is likely to influence their perceptions of group performance across subjective dimensions such as creativity. Moreover, organizational efforts to embrace and promote diversity (e.g., diversity training) can reinforce people's lay theory of group diversity on creativity and amplify the effects of diversity as either a bonus or a penalty in evaluation.

The research on the fundamental attribution error also holds important implications for both the individual and the organization. Individuals may reap the benefit of different evaluation contexts depending on the objective quality of group output. However, as the individual receives more credit, this may put the organization at risk. When people outside the company saw Jobs as Apple's only idea man, it upset Jonathan Ive because that made them "vulnerable as a company" (Isaacson, 2011) – his assertion was later confirmed when Apple stocks dwindled as a function of Jobs' struggling health in the later years of his tenure as CEO (Collingwood, 2009). After the death of Jobs, more people have started to recognize Ive as the creative engine behind

Apple. While this may satisfy Ive, it ironically puts Apple in a vulnerable situation similar to when Jobs was alive.

4.5 Conclusion

In sum, the questions addressed in this dissertation lay out the foundation for two research programs. The first research question provides new insights on the cognitive processes by which people assess group creativity – this work contributes to the initial step in exploring how lay theories about groups affect the assessment of group performance. The second research question addresses the attribution error in the evaluation of individual creativity and opens the door for further investigation on factors that influence how observers infer individual performance in a group context. Taken together, the two questions stress the need for further research on factors that influence perception of creativity in the context of an organization.

Appendix A. The logos in Study 1

Appendix B. The logos in Study 3

Highly creative logo

Uncreative logo

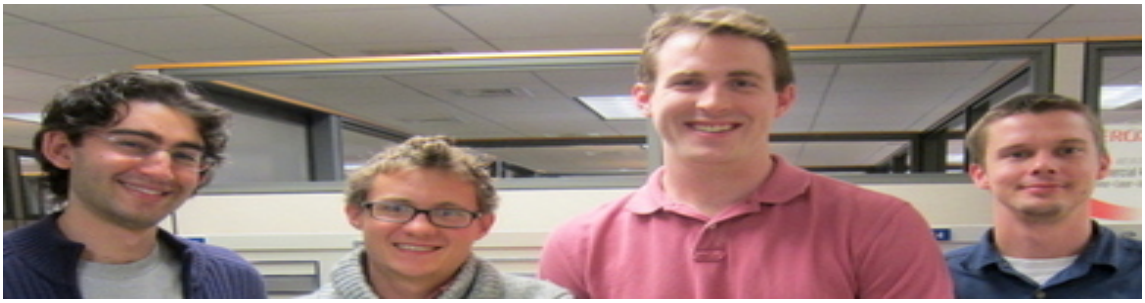
Appendix C. The photos in Study 1

Homogeneous group 1: Asian females

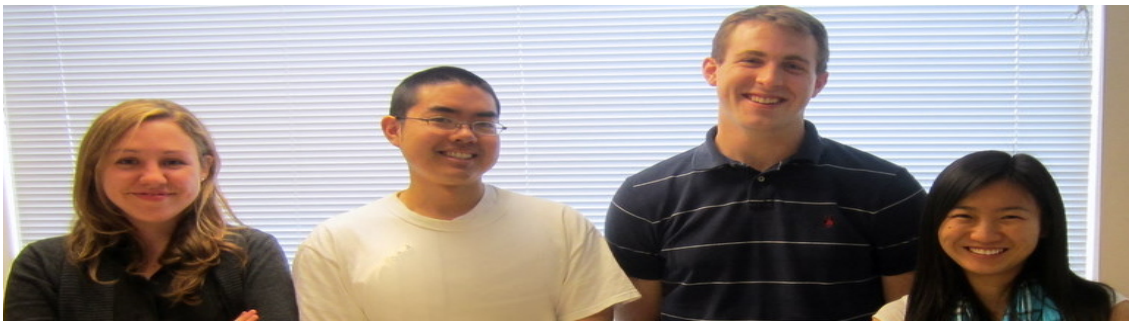
Homogeneous group 2: Asian males

Homogeneous group 3: Caucasian females

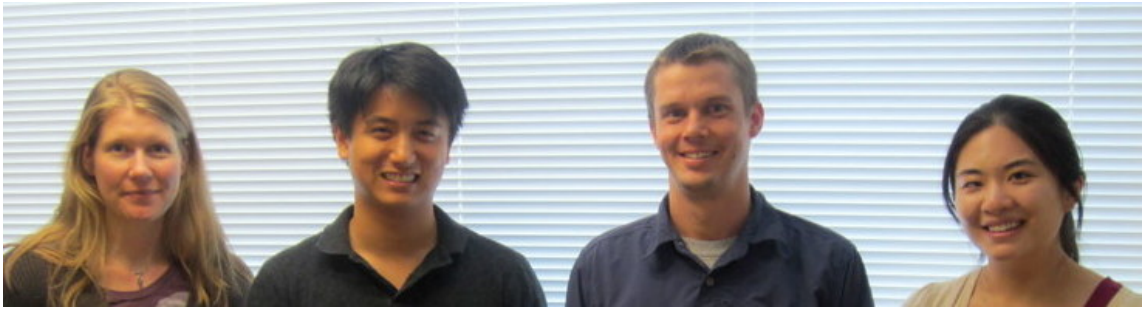
Homogeneous group 4: Caucasian males



Diverse group 1



Diverse group 2



Appendix D. The two diverse group photos in Study 2 and Study 3

Diverse group 1

Diverse group 2

Appendix E. The questionnaire items in Study 2

Cognitive diversity

1. Before creating the logo, this group had to brainstorm for ideas. One key aspect of brainstorming is to have different perspectives. Overall, how many different perspectives do you think the group members had? (1 = *only a few different perspectives*, 9 = *a lot of different perspectives*)
2. As a result of brainstorming, they generated ideas for the logo. How many unique ideas for a logo do you think this group generated in a brainstorming session? (1 = *only a few unique ideas*, 9 = *a lot of unique ideas*)
3. Converting ideas into actual logo requires many different skill sets. Overall, how many different skill sets do you think this group had? (1= *only a few skill sets*, 9= *a lot of different skill sets*)
4. The group faced obstacles while converting ideas into the actual logo. How good do you think this group is at problem solving? (1= I, 9= *very good at problem solving*)

Halo effect

5. While creating the logo, this group was working with various deadlines. How good do you think this group is in meeting work deadlines? (1 = *not good at meeting deadlines*, 9 = *very good at meeting deadlines*)
6. How much do you think the members of this group like each other? (1= *do not like each other at all*, 9 = *like each other very much*)

7. How much do you think the members of this group hang out with each other after work? (1= *do not hang out at all*, 9 = *hang out a lot*)
8. How well do you think the members of this group communicate with each other? (1= *do not communicate with each other at all*, 9 = *communicate with each other very well*)
9. How much do you think the members of this group trust each other to do their parts in creating the logo? (1= *do not trust each other at all*, 9 = *trust each other very much*)

Appendix F. The questionnaire items in Study 4

Cognitive diversity

1. Before creating the logo, he had to brainstorm for ideas. One key aspect of brainstorming is to have different perspectives. Overall, how many different perspectives do you think he had while brainstorming for ideas? (1 = *only a few different perspectives*, 9 = *a lot of different perspectives*)
2. As a result of brainstorming, he generated ideas for the logo. How many unique ideas for a logo do you think he generated in brainstorming? (1 = *only a few unique ideas*, 9 = *a lot of unique ideas*)
3. He faced obstacles while converting ideas into the actual logo. How good do you think he is at problem solving? (1= I, 9= *very good at problem solving*)

Halo effect

4. While creating the logo, he was working with various deadlines. How good do you think he is in meeting work deadlines? (1 = *not good at meeting deadlines*, 9 = *very good at meeting deadlines*)
5. How much do you think the members of this group like him? (1= *do not like each other at all*, 9 = *like each other very much*)
6. How much do you think he hangs out with his group after work? (1= *do not hang out at all*, 9 = *hang out a lot*)
7. How well do you think he communicates with other members? (1= *do not communicate with each other at all*, 9 = *communicate with each other very well*)

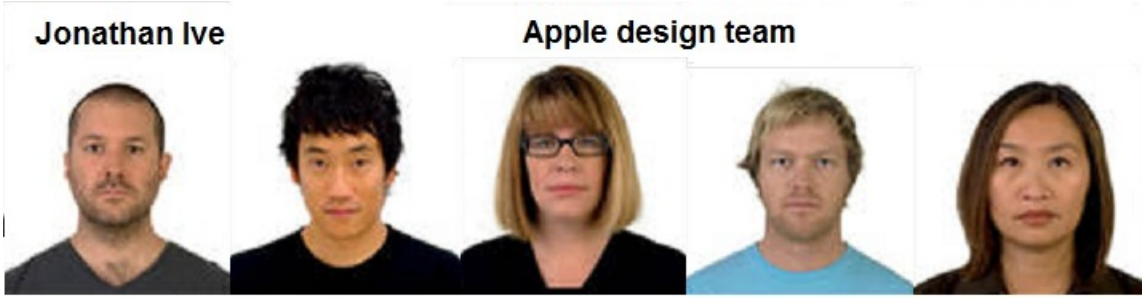
8. How much do you think the members of this group trust him to do his parts when they work together on a project? (1= *do not trust him at all*, 9 = *trust him very much*)

Appendix G. The photos in Study 5

Jonathan Ive alone

Jonathan Ive in a demographically homogeneous group

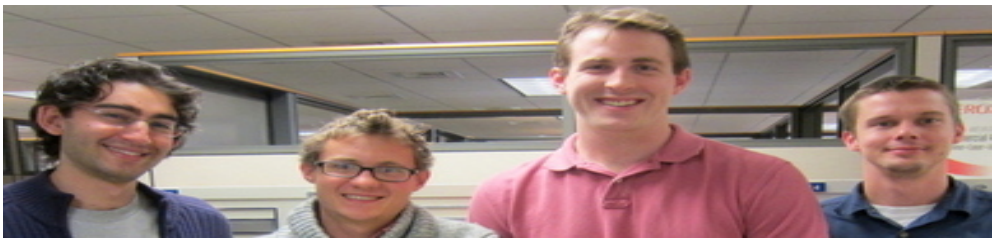
Jonathan Ive in a demographically diverse group



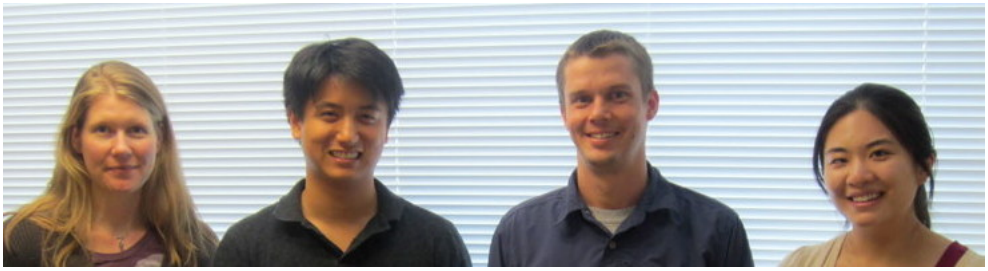
Appendix H. The photos in Study 6

Target alone

Target in a demographically homogeneous group



Target in a demographically diverse group



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Biography

Min Kay was born in Seoul, South Korea on June 27th, 1981. At age 13, he moved to Vancouver, Canada where he attended secondary education. Min attended University of Waterloo in Canada where he received his Bachelor of Applied Science in Environmental Chemical Engineering (with a Management Science option) in May, 2004 and Master of Applied Science in Management Science in May, 2007. Min's research focused mainly on factors that influence performance evaluation across objective and subjective dimensions with Prof. Rick Larrick and on factors that lead to overconfidence with Prof. Jack Soll. In 2007, Min joined Duke University to start his Ph.D. in Business Administration. Min is a member of the Academy of Management Society and the Society for Judgment and Decision Making.